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STUDIES OF THE EFFECTS OF SYSTEMATIC VARIATIONS OF CERTAIN CONDITIONS RELATED TO LEARNING. II. CONDITIONS OF PRACTICE.
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THIS INVESTIGATION STUDIED THE EFFECTS AND INTERACTION OF SELECTED PRACTICE, TASK, AND SUBJECT VARIABLES ON LEARNING PERFORMANCE. SUBJECTS SELECTED WERE RETARDED, NORMAL, AND SUPERIOR CAUCASIAN PUPILS. EACH WAS ADMINISTERED EIGHT TASKS FORMED BY COMBINING THE TASK MEANINGFULNESS AND RECITATION TYPE VARIANTS. THESE TASKS WERE ADMINISTERED IN CONJUNCTION WITH SIX COMBINATIONS OF MATERIAL AND PRACTICE DISTRIBUTION VARIANTS. THE SPECIFIC COMBINATIONS OF VARIANTS ADMINISTERED TO SUBJECTS AS THEY PERFORMED TASKS WERE DETERMINED BY PARTICULAR BASE CELL GROUPS. IN TURN, COMBINATION OF VARIANTS ADMINISTERED SUBJECTS IN A BASE CELL GROUP WAS CHANGED FROM TASK TO TASK. TWO PRACTICE VARIABLES, RECITATION TYPE AND AMOUNT OF MATERIAL, EACH AFFECTED LEARNING PERFORMANCE, WHILE THE THIRD, PRACTICE DISTRIBUTION, DID NOT. THE TASK VARIABLE, MEANINGFULNESS OF MATERIAL, DID NOT AFFECT LEARNING PERFORMANCE. AMONG THE SUBJECT VARIABLES, MENTAL AGE AFFECTED LEARNING PERFORMANCE, WHILE CHRONOLOGICAL AGE, INTELLIGENCE LEVEL, AND SEX DID NOT. GENERALLY, NO INTERACTIONS OCCURRED. DIFFERENCES WERE PRESENT BETWEEN GROUPS FORMED BY THE SEVERAL COMBINATIONS OF THE PRACTICE, TASK, AND SUBJECT VARIABLES. HOWEVER, THERE WAS NO EVIDENCE THAT THESE DIFFERENCES WERE CONSISTENTLY AND SYSTEMATICALLY HETEROGENOUS. (JL)

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STUDIES OF THE EFFECTS OF SYSTEMATIC VARIATIONS OF CERTAIN CONDITIONS RELATED TO LEARNING.
II. CONDITIONS OF PRACTICE

Cooperative Research Project No. 695

Kathryn A. Blake, Project Director
with the cooperation of
Charlotte L. Williams
Rebecca S. Dover
J. L. Carmon
and others

Office of General Research, University of Georgia
and the
Clarke County (Georgia) School District

Athens, Georgia
1961

The research reported herein was supported through the Cooperative Research Program of the Office of Education, U. S. Department of Health, Education, and Welfare.

PREFACE

The investigation reported herein was conducted pursuant to contract for Cooperative Research Project Number 695. The work was supported through the Cooperative Research Program of the Office of Education, U. S. Department of Health, Education, and Welfare.

Many people participated in the performance of the project. To acknowledge those whose cooperation and assistance contributed so much to completing the research is indeed a pleasure. Sincere appreciation is extended to the people named below.

Mrs. Charlotte L. Williams, Mrs. Rebecca S. Dover, and Dr. James L. Carmon, Head of the Department of Experimental Statistics at the University of Georgia, assumed major roles. The success of the investigation was enhanced greatly by the many hours of complex and tedious work which these three people did so graciously under difficult conditions associated with extreme time pressures. Mrs. Williams was the project manager. She coordinated activities involved in locating subjects, collecting data, organizing and analyzing the data, and preparing the final report. Mrs. Dover supervised the clerical procedures required for preparing task materials, obtaining supplies and equipment, and producing the final report. Dr. Carmon directed the machine processing of the data. Also, he gave advice about encoding and decoding of statistical material, techniques employed in the supplementary statistical analyses, and interpretation of the statistical data.

Allocation of time for the project director to devote to the research was made possible by the following administrators at the University of Georgia: Dr. John O. Dotson, former Dean, College of Education; Dr. Joseph A. Williams, present Dean, College of Education; Dr. Stanley H. Ainsworth, Chairman Program for Exceptional Children; and Dr. Robert A. McRorie, Director, Office of General Research. In addition, during the last stages of final report preparation when time required for project work exceeded that allocated, Dean Williams and Dr. Ainsworth kindly made further work load adjustments.

A large number of public school pupils participated in activities required for developing the tasks and collecting the experimental data. Personnel of the Clarke County (Georgia) School District provided the setting in which the research was conducted. The investigation, as performed, would have been impossible without the generous cooperation of Mr. Sam W. Wood, Superintendent,

and Mr. Alton A. Ellis, Director of Curriculum. Not only did Mr. Wood and Mr. Ellis allow research personnel access to the schools but also they expedited the work of the project in many ways. Administrative personnel who were most helpful by granting permission for the research to be conducted with pupils under their jurisdiction and by directly assisting in making arrangements for testing facilities and subject scheduling included the following: Athens High School--Mr. Guy Driver, Principal, and Mrs. Laura P. Marbut, Counselor; Clarke County Junior High School--Mr. A. Q. Hagan, Principal, and Mrs. Florence L. Rambo, Counselor; Alps Road Elementary School--Miss Helen Treanor, Principal; David C. Barrow Elementary School--Mrs. Rosa P. Tarpley, Principal; Chase Street Elementary School--Mrs. Hampton Rowland, former Principal; and College Avenue Elementary School--Miss Magdalene Glenn, former Principal. The many teaching personnel from whose classes the subjects were selected are named in Appendix A. Especial acknowledgement and appreciation are due these teachers for their kind toleration of interrupted class schedules and other inconveniences related to conducting research in the on-going school situation. Also named in Appendix A are clerical personnel who helped in locating the subjects.

Research assistants who administered intelligence test and experimental tasks to the subjects were Miss Elizabeth C. Aderhold, Mr. Jerry C. Allen, Mrs. Elizabeth W. Newman, and Mrs. Mary H. Winiarski. Also, each research assistant assumed other duties. During the first year of the project, Miss Aderhold located subjects and scheduled all subject contacts for intelligence testing and task administration; Mrs. Newman developed basic task materials; and Mr. Allen pilot-tested preliminary task materials and prepared the final forms of the tasks for administration. During the second year of the project, Mrs. Newman and Mrs. Winiarski scored tasks and encoded data.

Personnel of the Department of Experimental Statistics at the University of Georgia performed the machine processing of the data. Mr. James C. Fortson was responsible for the computer operations; Mr. Lamar Kitchens assisted Mr. Fortson. Mrs. Reba Chambers and Mrs. Miriam Thompson were the key punch operators who produced the IBM cards.

Decoding data after machine processing and performing supplementary statistical analyses involved the following people: Mr. F. Niles Dover, Mr. Douglas L. Gatchell, Mr. Michael V. Horton, Miss Sara M. Potts, and Mr. Robert S. Williams. Mrs. Newman and Mrs. Winiarski also contributed to

these activities. Leadership in this facet of the work was assigned to Mr. Dover.

Mrs. Norma J. Galbreath performed a major part of the typing of the several drafts of the manuscript for the final report. She did an especially efficient job during the final days of manuscript preparation when the time pressure was inordinately severe.

Mrs. Sara Fabian typed much of the content involved in preparing the original task materials for the subjects. Miss Lane Harden, Mrs. Patricia A. Mason, and Mrs. Elizabeth M. Coode contributed to the typing of the final manuscript.

Mrs. Faye A. Day assumed the task of mimeographing the material in the appendices. This work was done at the Trade and Industrial Teacher Training Department, Division of Agricultural Education in the College of Education. Facilities were made available by Mr. Clarence H. Collier.

The multilith work involved in reproducing the body of the report was performed at the Bureau of Business Research in the College of Business at the University of Georgia. Dr. William B. Keeling and Mr. David C. Hodge supervised the process. Mr. Milton E. Nix, Jr. performed the machine operations.

Mrs. Jacqueline L. Tucker proofread the manuscript for typographical errors and inconsistencies in format. She was assisted by Mrs. Carolyn Nunnally and Mrs. Faye Swindell.

Miss Helen Westbrook edited the manuscript. Her work contributed much to the clarity and grammatical accuracy with which the material was presented.

While those who are named above in this prefactory statement made valuable contributions to the improvement of and the completion of the research, the project director alone bears the entire and final responsibility for any errors and inadequacies in planning, execution, interpretation, and reporting.

K.B.

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CHAPTER I

PROBLEM

Purpose and Objectives

The purpose of this investigation was to study the effects and interaction effects of selected practice, task, and subject variables on learning performance. The practice variables included recitation type, practice distribution, and amount of material (whole-parts approaches). The task variable was task meaningfulness. The subject variables consisted of mental age, chronological age, intelligence level, and sex. Specifically, the objectives were to examine the following.

1. Effects of the practice variables on learning performance.
2. Effect of the task variable on learning performance.
3. Effects of the subject variables on learning performance.
4. Interaction effects of the practice variables on learning performance.
5. Interaction effect of the subject variables on learning performance.
6. Interaction effects of the practice and task variables on learning performance.
7. Interaction effects of the practice and subject variables on learning performance.
8. Interaction effect of the task and subject variables on learning performance.
9. Interaction effects of the practice, task, and subject variables on learning performance.

Educational Significance

Gardner and his associates (1958, 1961), who wrote the panel report on The Pursuit of Excellence: Education and the Future of America, succinctly stated a major educational goal.

> But though the educational patterns (for individuals who have different capacities) may differ, the goals remain much the same for all: enabling each young person to go as far as his aptitude will permit in fundamental knowledge and skills and motivating him to continue his self-development to the full along similar lines (p.32, p. 373).

Accomplishing this goal is a primary concern of those who seek to achieve excellence through an educational framework designed to foster in each student the ability to use his talents in the process of satisfying his own personal needs and contributing to the society of which he is a member. A problem is posed, however, by evidence that this goal is not being attained to a desired extent (Cruickshank, 1946; Cruickshank, 1956; Dunn, 1954; Fleigler and Bish, 1959; Gardner, 1961; Monroe, 1948). Sarason and his associates (1960) portray the generality of the problem in the following comments.

> ... (The concern is) with an extremely broad and important problem: the relationships and discrepancies between performance and potential. It is no exaggeration to say that the relationship between what man does and what he is capable of has always concerned the thinker and scholar regardless of his field. This is not surprising when one considers that these relationships touch upon the even more general problem of the nature of man (p.1).

This problem is an especially crucial one for educators and solutions are contingent upon examining some of its bases. Such an examination involves studying a number of facets of the educational process. One important facet is conditions related to learning. To explore this facet in some depth, the present investigator undertook the research program of which the study reported herein is one phase.

The research program may be described briefly in terms of problem, orientation, and content. The overall problem for the research program involves studying how systematically varying certain conditions related to learning affects, and interacts to affect, learning performance. The research program's general orientation is that basic information about this research problem is significant for the field of education in this sense: a number of educational (methodological and curricular) decisions are predicated to a great extent, upon the manner in which individuals learn; consequently, making the most efficient decisions in these cases is facilitated by knowledge about how the individuals in question respond to conditions of which learning is a function. The research program's content is exemplified in a statement by Jordan (1961). In his statement, he captures the essence of more complex, but pertinent, behavior models: "The consideration of any learning problem might be schematized as some interaction of (1) learner variables, (2) task variables, and (3) method variables" (p. 109). Each study in the research program includes all three of these elements; the nature of the elements and the extent to which they are considered differ, to some extent, from study to study.

The first investigation in the research program was *Studies of the Effects of Systematic Variations of Certain Conditions Related to Learning. I. Conditions of Reinforcement* (Blake, 1959). Essentially, a study was made of the effects and interaction effects of certain reinforcement, task, and subject variables on learning performance and level of aspiration behavior. The specific antecedent variables were the following: reinforcement variables--type, frequency, orientation, and point of introduction of reinforcement; task variables--level of complexity and extent of overt verbalization involved in the task activities; and subject variables--intelligence level and chronological age with mental age held constant.

The first investigation was extended under the title, *Systematic Variation of Certain Conditions Related to Learning in the Mentally Retarded: Reinforcement* (Blake, Donlon, Fleigler, and Trippe, 1961). Essentially, this extension, now in progress, includes several facets: *viz.*, complete replication of the procedures of the original investigation with a group of intellectually retarded subjects who were placed in 24-hour residential situations and who attended school within the institution; combination of the data obtained in the original investigation and the data obtained with the institutionalized subjects; analysis of these combined data; and, writing a new final report.

The second investigation in the research program, *Studies of the Effects of Systematic Variations of Certain Conditions Related to Learning. II. Conditions of Practice*, is the subject of the present final report.

The third investigation in the research program is *Studies of the*

Effects of Systematic Variations of Certain Conditions Related to Learning. III. Task Conditions (Blake, 1964). This study is now in progress. Essentially, a study is being made of the effects and interaction effects of certain task and subject variables. The specific antecedent variables are the following: task variables--level of complexity of task activities, level of abstractness of task materials, type of presentation of task materials, and type of approach to task solution; and subject variables--intelligence level, chronological age, mental age, and sex.

Related Research

Research considered germane to the problem as delimited encompassed the work of investigators who studied the practice, task, and subject variables selected for examination in this project. A distinction was made in this review between investigations employing children and adolescents as subjects and those employing adults as subjects; college students were classified as adults. In addition, excluded from review were studies in which the dependent variables were reaction time, immediate memory span, delayed reaction, academic achievement, *etc*. The concentration was on studies in which the dependent variable was learning performance as it was defined for the purposes of this investigation: *viz*., change in the response measure in the expected direction as a function of repetition (McGeoch and Irion, 1952).

A brief summary of research reviewed is presented below. For each variable, the presentation is structured in terms of the following topics: description of the general model used to study the problem, citation of investigations in which children were subjects, citation of investigations in which adults were subjects, summary of obtained results, and specification of unresolved issues relevant to the problem.

Recitation Type

Investigators studying the role of recitation in learning were concerned primarily with the relative performance of control subjects who spent the total time reading and thus did not recite and experimental subjects who used some time reading and some time reciting. That is, control subjects continuously repeated the material to be learned in the presence of the material; in addition to some repetitive practice using the material, the experimental subjects recited, with or without prompting, in the absence of the material.

Among investigators who used children and adolescents as subjects were Forlano (1936), Gates (1917), Sones and Stroud (1940), Spitzer (1939), and Vandell, Davis, and Clingston (1943). Among investigators who used adults as subjects were Krueger (1930a; 1930b), Perry (1939), Peterson (1944), Skaggs (1920), Skaggs and Grossman (1930), and Skaggs, Grossman, L. Krueger, and W. Krueger (1930). These investigators used a variety of tasks; e.g., card sorting and serial or paired associate learning of nonsense syllables, single words, poetry, prose selections related to various topics, symbol-digit pairs, etc.

The several investigators obtained evidence which indicated that combining reading with recitation, with or without prompting, was more conducive to learning than reading without recitation. Still unresolved is the extent to which the effect of recitation was a function of factors implicit in issues like these: consistency of the results if the control subjects were kept active by having them read aloud to insure that their attention was concentrated on the material; relative values of various recitation media like oral responses, written responses, etc.; type of task materials being learned; nature of other practice conditions existing concomitantly; and characteristics of the subjects.

Amount of Material

Investigators examining how amount of material (whole-parts approaches) influenced learning performance usually compared the responses of the following: subjects who practiced during each repetition the entire task; subjects who practiced during each repetition either separate parts obtained by dividing the entire task in various ways or different combinations of the several separate parts. Most frequently, the efficiency of the whole method was compared with the pure parts method and/or progressive parts method.

Investigators who selected children and adolescents as subjects included Clark and Worchester (1932), G. O. McGeoch (1931), Northway (1937), Pechstein (1926), Seagoe (1937a; 1937b), and Winch (1924). Investigators who employed adults as subjects were Brown (1924), Cook (1936;1937), Crafts (1929; 1930), Davis and Meenes (1932), Hoskins (1936), Lakenan (1913), Orbinson (1944), Pechstein (1917a; 1917b), Pyle and Snyder (1911), Reed (1924a), Seagoe (1936), and Seibert (1932). Among tasks which these investigators employed were card sorting and serial or paired associate learning of nonsense syllables, single words, poetry, prose selections related to various topics, and mazes.

Generally, the several investigators' results did not indicate that either the whole or any particular parts method was consistently more useful for learning; better performance was associated with the whole method in some situations and with one of the parts methods in other situations. Questions remain about the extent to which the effects of the several whole-parts approaches were contingent upon factors implicit in issues like these: type of task materials being used; nature of other practice conditions existing concomitantly; stage of practice at which material is divided into and recombined into parts; and characteristics of the subjects.

Practice Distribution

Investigators evaluating the manner in which various ways of distributing practice affected learning compared the performance adequacy of the following: subjects who repeated the material to be learned successively without stopping between repetitions; and subjects who had periods of non-practice on the material ranging from seconds to days interpolated between each repetition, between blocks of repetitions, or between combinations of these.

Foster (1928), Kirkwood (1926), and Munn (1909) studied children's and adolescents' responses to massed and distributed practice. Listed below are investigators who were concerned with adults' responses to various degrees of practice distribution: Adams and Reynolds (1954), Archer (1953), Braun and Heymann (1958), Brown and Archer (1956), Bumstead (1940; 1943), Cook (1928), Cook (1937; 1944), Epstein (1950), Forese (1957), Gauvrin (1958), Gentry (1940), Hovland (1938; 1940a; 1940b; 1949), Isao (1948; 1950; 1951), Kendler, Greenberg, and Rubman (1952), Kientzle (1946; 1949), Kimble (1949), Lyon (1914), Norris (1953), Oseas and Underwood (1952), Perkins (1914), Pyle (1914), Reynolds and Adams (1953), Riley (1952), Shakle and Jones (1953), Underwood (1951a; 1951b; 1952a; 1952b; 1953a; 1953b; 1953c; 1954; 1957b; 1957c; 1957d), Underwood and Archer (1955), Underwood and Good (1951), Underwood and Richardson (1955), Underwood and Richardson (1958), Underwood and Viterna (1951), and Wright and Taylor (1949). Essentially, the several investigators used such tasks as these: serial or paired associate learning of nonsense syllables, single words, prose selections relevant to various topics, and poetry; code substitution; mazes; anagrams; concept learning; and various types of problem solving.

Data which these investigators obtained were not completely consistent. More adequate learning performance resulted from a form of spaced practice in some studies and from massed practice in other studies. Still in need of clarification is the extent to which effects of the several degrees of distribution were associated with factors related to issues like the following: degree to which uncontrolled practice is possible; quantity of material involved (total task length); meaningfulness of the material; length of practice intervals in terms of time for forgetting _vs._ work decrement resulting from fatigue, boredom, and other sources of inhibition; and characteristics of the subjects.

Task Meaningfulness

Investigators concerned with how task meaningfulness influenced learning performance used several dimensions for defining meaningfulness. Pertinent here is research in which the model consisted of comparing the learning performance of subjects who were dealing with material involving a logical relationship between the stimulus-response components and subjects who were dealing with material involving an arbitrary combination of stimulus-response components.

Carlson and Carr (1940), Hilgard, Irvine, and Whipple (1953), McKee (1927), and Snygg (1935) were among investigators who employed children and adolescents as subjects in studying this problem. Researchers who used adults as subjects were English, Welborn, and Killian (1934), Guilford (1927), Jones and English (1926), Katona (1940;1942), Killian (1934), Reed (1918), and Snygg (1935). These investigators employed tasks which consisted of these materials: nonsense syllables; single words; sentences and prose selections pertinent to various topics; and different academic subjects.

Although the several investigators' results were not completely unequivocal, other things being equal, logically related material was learned more rapidly than non-logically related material. However, still to be determined is the extent to which the effects of variants of task meaningfulness were a function of these and similar issues: difficulty of the relationship on the basis of which the material is organized; amenability of the task material to organization in terms of a relationship; nature of other practice conditions existing concomitantly; and capability of subjects for discovering and using a principle or logical relationship.

Mental Age, Chronological Age, and Intelligence Level

Investigators adopted several models for studying the role of mental age, chronological age, and intelligence level in learning performance: briefly, CA varied and IQ apparently ignored; IQ held constant and MA and CA varied; MA held constant and IQ and CA varied; CA held constant and MA and IQ varied. Among investigators using these models were the following: CA varied, no particular effort reported to control IQ and MA--Foster (1928), Gardner (1945), Garrett, Bryan, and Perl (1935), Heidbredder (1928), Kulcinski (1945), Miles (1933), Munn (1909), Myers (1913), Ruch (1934), Thorndike (1928), and Werner (1940); IQ held constant, CA and MA varied--Ring and Palermo (1961), Stroud and Maul (1933), Tilton (1949), and Wilson (1928); MA held constant, CA and IQ varied--Blake (1959), Cassell (1957), Colvin (1915), House and Zeaman (1958), Johnson and Blake (1960), McCulloch, Reswick, and Weissman (1955a; 1955b), Stevenson and Isco (1954), Stevenson and Zigler (1957), Wilson (1928), and Woodrow (1917); CA held constant, IQ and MA varied--Barnett and Cantor (1957), Berkson and Cantor (1960), Cantor and Hottell (1955), [illegible] deSanctis (1931), Ellis and Sloan (1957), Eisman (1958), Gardner (1945), Griffith, Spitz, and Lipman (1959), House and Zeaman (1958), Johnson (1958), Kaufman and Peterson (1958), Kuhlman (1906), Plenderleith (1956), Reynolds and Stacey (1955), Ring and Palermo (1961), Roberts (1933), Simrall (1947), Spence and Townsend (1930), Stacey and Portnoy (1951-1952), Stevenson and McBee (1958), Stevenson and Swartz (1958), Thompson and Witryol (1946), Ward (1937), Wilson (1928), and Woodrow (1938; 1945). These investigators have used to elicit learning performance a variety of situations ranging from gross motor tasks to complex ideational tasks.

Several investigators reported null relationships. Other investigators supplied evidence that performance adequacy generally tended to increase as MA, CA, or IQ increased. Further, when several different investigators' results were collated, there was some indication of these relationships: IQ and MA were more highly associated with performance adequacy on tasks primarily involving verbal and ideational components; on the other hand, when other factors were held constant, CA was more highly associated with performance adequacy on tasks primarily involving motor elements. The ultimate potential sizes of the positive relationship between CA, IQ, and MA and learning performance and the basic nature and extent of the interaction between task and subject variables both would seem to be contingent upon factors implicit in such issues as these: heterogeneity of the samples in terms of the selection criterion employed; methods of practice used in learning the task materials; nature of the task materials; difficulty levels of the tasks; and bases on which the subject variables were dimensionalized.

Sex

A number of investigators studied the relative learning performance of male and female subjects. Investigators using children as subjects included Batalla (1936), Bergen (1943), Dickinson and Tyler (1944), Easby-Grave (1924), Garrett, Bryan, and Perl (1935), Hicks (1931), Mattson (1933), McAndrew (1943), McGinnis ([illegible]), Perl (1933), Pyle (1925), Weig (1932), and Young (1922). Learning tasks used in these studies included mazes, cancellation, memorizing prose selections germane to various topics, concept formation, and problem solving.

Generally, the several investigators obtained information which indicated these relationships: on some tasks, males performed more adequately than females; on others, the converse occurred; on others, no differences were apparent. Still needed is information pertinent to whether the effect of the sex variable is influenced by factors inherent in issues like these: type of material being learned; roles of other subject characteristics in combination with the sex variable; and nature of other practice conditions existing concomitantly.

Needed Research

Cited above was previously conducted research related to the several practice, task, and subject variables being examined in this investigation; to wit, recitation type, amount of material, practice distribution, task meaningfulness, intelligence level, chronological age, mental age, and sex. No investigation reviewed yielded data which were completely unequivocal. The effect of any one variable seemed contingent upon the extent to which other influences were operating concomitantly. Subsequent to the presentation of evidence germane to each variable, suggestions were made about factors which could be influential in mediating the effects of that variable.

Problems implicit in these factors needed study in further research devoted to each variable and to the possible interaction among the several variables. These problems represented the concern in the present investigation. Specifically, this investigation was designed to obtain information about the effects on learning performance of the practice, task, and subject variables considered singly and in combination.

CHAPTER II

PROCEDURE

Experimental Design

The purpose in this investigation was to study the effects and interaction effects on learning performance of selected practice, task, and subject variables. Figure 1 represents the basic experimental design considered appropriate for this purpose.

Explicated in the structure of this design is the manner in which the three major components--the practice, task, and subject variables--were dimensionalized. The practice variables were recitation type, amount of material, and practice distribution. The recitation type variable encompassed four variants--reading with no recitation, reading with verbal recitation, reading with written recitation, and reading with verbal and written recitation. The amount of material variable had three variants--whole, pure parts, and progressive parts. The practice distribution variable included two variants--massed and distributed. The task variable was labeled task meaningfulness; in terms of this variable, the tasks were dichotomized into those composed of logically related materials and those composed of non-logically related materials. The four subject variables were mental age, chronological age, intelligence levels, and sex. Practice level refers to the points in the trial sequence at which tests were given to obtain response measures.

The methodology implicit in this design is described briefly below. Subjects were chosen for groups, termed major levels groups, in such a way that selected combinations of MA, CA, and IQ were obtained by holding constant and varying these characteristics in several ways: MA held constant, CA and IQ varied; CA held constant, MA and IQ varied; and IQ held constant, MA and CA varied. No attempt was made to control sex frequencies by selection.

The overlap of the three amount of material variants and the two practice distribution variants formed six combinations: whole method--massed practice; whole method--distributed practice; pure parts method--

Figure 1 - Experimental Design[a]

(B) Levels (Chronological Age, Mental Age, and Intelligence Levels)		B1, Retarded; B2, Younger Normal; B3, Youngest Superior; B4, Intermediate Superior; B5, Older Normal; B6, Oldest Superior							
(R) Recitation Type		(R1) Reading -- No Recitation		(R2) Reading -- Verbal Recitation		(R3) Reading -- Written Recitation		(R4) Reading -- Verbal & Written Recitation	
(M) Task Meaningfulness		(M1) Logical	(M2)Non Logical	(M1) Logical	(M2)Non Logical	(M1) Logical	(M2)Non Logical	(M1) Logical	(M2)Non Logical
(D) Amount of Material	(C) Practice Distribution	Practice Level(A) 1 2 3 4	Practice Level(A) 1 2 3 4	Practice Level(A) 1 2 3 4	Practice Level(A) 1 2 3 4	Practice Level(A) 1 2 3 4	Practice Level(A) 1 2 3 4	Practice Level(A) 1 2 3 4	Practice Level(A) 1 2 3 4
(D1) Whole Method	(C1) Massed	1	4	3	2	6	5	3	6
	(C2) Distributed	2	5	1	3	4	6	4	2
(D2) Pure Parts Method	(C1) Massed	3	1	4	6	5	2	1	5
	(C2) Distributed	4	6	5	1	2	3	6	3
(D3) Progressive Parts Method	(C1) Massed	5	2	6	4	3	1	5	1
	(C2) Distributed	6	3	2	5	1	4	2	4

[a] The numbers within the cells refer to subgroups which were designated base cell groups. The arrangement of these numbers within the figure reflects the combination of the amount of material and practice distribution variants administered to the subjects as they responded to the several tasks. Throughout the report, the alphanumeric combinations cited within the figure are used in referring to the several major levels groups and practice variables both singly and in combination.

massed practice; etc. Subgroups of subjects, termed base cell groups, were defined by these six combinations. The subjects within each major levels group were assigned randomly to these six base cells, thus forming 36 base cell subgroups of subjects for the entire design.

The four recitation variants and the two task meaningfulness variants were administered within the framework of the six combinations formed by the overlap of the amount of material and practice distribution variables. Consequently, eight tasks of equivalent difficulty were required for the eight combinations of the recitation and meaningfulness variables. The subjects in the several base cell subgroups were administered each of the eight tasks. The combinations of the amount of material and practice distribution variants administered to the subjects in the several base cell groups were varied in an irregular fashion from task to task.

The subsequent sections of the chapter include an expanded discussion of these structural and methodological aspects of the experimental design.

Subjects

Four subject variables were considered: viz., intelligence level, chronological age level, mental age level, and sex. One facet of the problem delimited for study was to determine whether these subject variables affect, or interact with the practice and task variables to affect, learning performance. To accomplish this, six major levels groups of subjects were selected, and, in turn, assigned randomly to six base cell groups. The considerations involved in subject selection are described below in terms of these topics: definitions of terms, sampling plan, sampling criteria, sampling procedures, descriptive statistics relevant to the subject variables, and inferential statistics relevant to the subject variables.

Definitions of Terms

For the purposes of this investigation, the definitions of terms listed below were employed in reference to the subjects.

1. Mental age. Quantitative index reflecting the total number of items successfully completed by a subject on the Form L of

the Stanford-Binet Test of Intelligence, 1937 Revision (Terman and Merrill, 1937).

2. Chronological age. Age determined by subtracting a subject's birth date from a specified date prior to the initiation of the task administration.

3. Intelligence level. Index reflecting the relative status of a subject in the normative population associated with a standardized intelligence test.

4. Intellectually retarded subjects. Subjects whose intelligence levels are within the limits of 50 to 75.

5. Intellectually normal subjects. Subjects whose intelligence levels are within the limits of 90 to 110.

6. Intellectually superior subjects. Subjects whose intelligence levels are 120 or higher.

Sampling Plan

Reference to Figure 2 reveals the sampling plan used as a guide to select subjects in such a way that MA, CA, and IQ each was held constant and varied at several levels. The basic groups, termed MA control groups, contained retarded (B1), normal (B2), and superior (B3) subjects whose MA's were held constant between 8 years 6 months and 11 years 6 months and whose IQ's and CA's varied. These MA control groups were used as bases for establishing additional groups, termed CA control groups, in which subjects' CA's were held constant and MA's and intelligence levels varied. That is, selected for the CA control groups were these subjects: normal (B5) and superior (B6) subjects whose CA's were within the same range as those of the retarded (B1) MA control subjects; and superior (B4) subjects whose CA's were within the same range as those of the normal (B2) MA control subjects. Resulting from these procedures were groups, termed IQ control groups,[1] in which subjects' intelligence levels were similar and CA's and MA's varied. The IQ control groups included these subjects: normal (B5) subjects who had intelligence levels within the same range as those of the normal (B2) MA control subjects, and superior (B4 and B6) subjects who had intelligence

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[1] Because of administrative exigencies, the MA control subjects' intelligence levels were assessed by an individual test; the remaining subjects', by group tests.

Figure 2

Sampling Plan

Type of Control	Group Designation	Group Name	Combination of Subject Variables
Mental Age Level	B1	Retarded	MA held constant between 8-6 and 11-6 years; IQ and CA varied.
	B2	Younger Normal	
	B3	Youngest Superior	
Chronological Age Level	B2	Younger Normal	CA held constant between 8-0 and 11-0 years and between 12-0 and 17-0 years; IQ and MA varied.
	B4	Intermediate Superior	
	B1	Retarded	
	B5	Older Normal	
	B6	Oldest Superior	
Intelligence Level	B2	Younger Normal	Intelligence level similar between 90 and 110 and above 120; CA and MA varied.
	B5	Older Normal	
	B3	Youngest Superior	
	B4	Intermediate Superior	
	B6	Oldest Superior	

levels within the same range as those of the superior (B3) MA control subjects.

Retarded subjects who had CA's equivalent to the normal (B2) and superior (B3) MA control subjects and normal subjects who had CA's equivalent to the superior (B3) MA control subjects were not selected. Such subjects probably would have had MA's too low to respond adequately to the tasks as they had to be developed on the basis of other considerations.

Sampling Criteria

Selected as possible subjects for the investigation were retarded, normal, and superior Caucasian pupils who satisfied the requirements listed below in addition to those implicit in the sampling plan just presented.

1. Enrollment in public school.
2. Absence--as judged by the classroom teachers, the principals, the guidance counsellors, and/or the investigators--of major emotional disturbances which could be detrimental to task performance.
3. Absence of minor, uncorrected physical or sensory limitations which could interfere with task performance and absence of gross physical or sensory limitations.

Sampling Procedures

Selected from public school regular and special classes were 288 Specified subjects who had characteristics consistent with the criteria specified above. The selection process involved pupils enrolled in five schools within the Clarke County (Georgia) School District. Several steps were used in this selection process. School records were examined; also, teachers, principals, and guidance counsellors were consulted. On the basis of data thus accrued, lists of prospective subjects were established. Potential subjects for the MA control groups (B1, B2, and B3) were administered the Form L of the Stanford-Binet Test of Intelligence, 1937 Revision. Intellectual characteristics of potential subjects for CA control groups (B4, B5 and B6) were estimated on the basis of test data obtained during the general school testing program; tests used were the California Test of Mental Maturity and the Otis Quick Scoring Tests of Mental Ability. The California Test of Mental Maturity was administered to potential CA control subjects for whom previous intelligence test data were not available. The CA's and MA's of potential subjects for the MA control groups were prorated in terms of these dates: February 25, 1960, subjects selected during the first year of task administration; November 1, 1960, subjects selected during the second year of task administration. The CA's of potential subjects in the CA control groups were prorated in terms of the date December 31, 1960.

Individuals who finally satisfied all sampling criteria were selected as subjects. These subjects were categorized by major levels group on the basis of their CA's, IQ's, and, when appropriate, MA's. Within each major levels group, subjects from the several schools were pooled and listed in an irregular order. Then, they were assigned code numbers from one to the total number in the group. The procedures for randomization and the table of random numbers presented by Edwards (1950) were used to assign subjects within each major levels group to respective sets of the six base cell subgroups required by the experimental design. Eight subjects were assigned to each base cell subgroup; consequently, each major levels group contained 48 subjects. Remaining subjects tentatively selected for the major levels groups were used as substitutes when attrition occurred.

One issue about this procedure which merits special discussion pertains to the use of different tests for obtaining data relevant to the IQ criterion. The Stanford-Binet test was employed for assessing MA control subjects' intelligence while the C.T.M.M. and the Otis tests were used in selecting CA control subjects. Selecting subjects on the basis of data yielded by the same intelligence test would have been more desirable; i.e., the procedures used might have involved comparing what Underwood (1957a) termed non-equivalent response measures. However, the cost-yield ratio related to administering the same test to all subjects had to be considered because of practical exigencies. The primary interest in the MA control groups necessitated that the Stanford-Binet test be used with these groups. The primary interests in the CA control groups and the IQ control groups required only that subjects be classified into rough categories which generally represented a continuum of intelligence level and which generally are mutually exclusive. The test data used were judged to be adequate for this rough classification. Employing the Stanford-Binet test for this rough classification was judged to be unnecessarily laborious and time consuming. Bases for these judgements are cited below.

1. No data were found about the correlation between scores on the Otis test and scores on the Stanford-Binet test or about the correlation between scores on the Otis test and the C.T.M.M. Sullivan, Clark, and Teigs (1957), reported a correlation of 0.88 between scores on the C.T.M.M. and scores on the Stanford-Binet test. Prediction equations and standard errors of estimate for selected scores were computed on the basis of this correlation. The data thus obtained indicated that, even though one to one correspondence between scores did not occur, subjects assigned to a certain category on the basis of C.T.M.M. data generally would rate placement in that category on the basis of the Stanford-Binet test data. This expectation is not vitiated by the following: Kuhlen's (1952) observation that the Otis tests have a ceiling for brighter subjects; Dearborn's and Rothney's (1941) data which demonstrated that, for example, subjects who had IQ's of 131 on the Otis test had IQ's of 149 on the Stanford-Binet test while subjects who had IQ's of 94 on the Otis test had IQ's of 102 on the Stanford-Binet test.

2. The reliability coefficients for the total scores for the Stanford-Binet test, the C.T.M.M., and the Otis test ranged above 0.90 (Otis, 1954; Sullivan, Clark, and Teigs, 1957; Terman and Merrill, 1937). These reliability coefficients were considered adequate; the measurement errors should be relatively small for scores on tests administered by conscientious and adequately trained personnel as was the case for the tests used herein.

3. For tests which are so standardized that the population means and standard deviations are approximately equivalent, generally the same percentage of the cases in the population should have IQ's on the several tests within similar ranges. For both the Stanford-Binet test and the C.T.M.M., the population means and standard deviations are 100 and 16, respectively; for the Otis tests the population mean is 100 and the standard deviations range between 10 and 19 points with a median value between 15 and 16 points (Otis, 1954; Sullivan, Clark, and Teigs, 1957; Terman and Merrill, 1937).

Descriptive Statistics Relevant to the Subject Variables

Appendix B contains information about each subject. Categorized according to base cell groups within major levels groups, this information includes each subject's identifying code number, school code number, mental age, chronological age, intelligence quotient, and sex. Only data about original subjects in the major levels groups are presented. The few substitutions made when attrition occurred are not listed.

In Tables 1, 2, and 3 are descriptive statistics reflecting the subjects' MA's, CA's, and IQ's. Table 1 includes MA data; Table 2, IQ data; and Table 3, CA data. Table 4 contains frequencies reflecting the sex distributions within the several categories.

Inferential Statistics Relevant to the Subject Variables

Determining whether the subject variables affect learning performance and whether they interact with the practice and task variables to affect learning performance necessitated that certain conditions related to the subject variables exist as much as possible. In other words, the major levels groups and base cell groups had to be equivalent or non-equivalent, in certain specified ways, in terms of the several subject variables. Pertinent information is presented below in terms of three topics: statistical analyses, relationships among the subject characteristics, and summary.

Statistical Analyses

Examining whether the conditions relevant to the subject variables existed required analyzing relationships among frequencies, within group variances, and means. The statistical techniques used in these analyses were the following: frequencies--the methods and minimum contrasts listed by Mainland, Herrera, and Sutcliff (1956); within-group variances--Snedecor F-tests of homogeneity of variance; means--three factor analyses of variance and paired comparisons employing _t_-tests (Edwards, 1950; Lindquist, 1953; and McNemar, 1955).

The .01 probability level was the criterion for rejecting the null hypothesis related to frequencies and means; and the .001 probability level, to within-group variances. When the null hypothesis pertaining to within-group variances was rejected, extreme heterogeneity was inferred to be present between the variances within the groups being compared; accordingly,

Table 1

Mental Ages (months) of Subjects Classified According to Base Cell Groups Within Major Levels Groups

Major Levels Group	Statistic	Base Cell Group 1	2	3	4	5	6	Total Group
B1	$\bar{X}$	119	125	124	118	121	128	123
	s	8	10	12	8	14	7	11
B2	$\bar{X}$	116	118	114	117	116	115	116
	s	11	8	11	8	11	9	10
B3	$\bar{X}$	125	126	128	127	125	128	126
	s	12	8	7	12	12	13	11

Table 2

Intelligence Quotients[a] of Subjects Classified According to Base Cell Subgroups Within Major Levels Groups

Major Levels Group	Statistic	Base Cell Group 1	2	3	4	5	6	Total Group
B1	$\bar{X}$	74	76	72	73	71	75	73
	s	5	5	7	5	9	4	6
B2	$\bar{X}$	102	100	102	100	101	104	101
	s	7	5	6	6	7	5	6
B3	$\bar{X}$	133	126	128	132	129	129	129
	s	6	4	8	13	5	9	8

[a] The IQ's of the B1, B2, and B3 subjects were based on performance on the Form L of the Stanford-Binet Test of Intelligence, 1937 Revision. The IQ's of the B4, B5, and B6 subjects were based on performance on the California Test of Mental Maturity and the Otis Quick Scoring Tests of Mental Ability. Scores on these latter tests were not combined to calculate means and standard deviations.

Table 3

Chronological Ages (months) of Subjects Classified According to Base Cell Groups Within Major Levels Groups

Major Levels Group	Statistic	Base Cell Group 1	2	3	4	5	6	Total Group
B1	$\bar{X}$	166	169	180	169	179	179	174
	s	10	8	9	18	11	13	13
B2	$\bar{X}$	114	118	112	118	115	111	115
	s	11	13	10	9	7	9	9
B3	$\bar{X}$	94	101	100	96	97	100	98
	s	7	9	6	8	9	11	9
B4	$\bar{X}$	124	116	115	121	122	115	119
	s	12	12	9	8	10	11	11
B5	$\bar{X}$	175	184	164	179	175	183	177
	s	19	10	10	13	17	6	15
B6	$\bar{X}$	172	164	165	176	186	179	174
	s	3	10	9	3	11	20	14

Table 4

Sex Distribution of Subjects Classified According to Base Cell Groups Within Major Levels Groups

Major Levels Group	B1		B2		B3		B4[a]		B5		B6		Total by Base Cell Group	
Base Cell Group	M	F	M	F	M	F	M	F	M	F	M	F	M	F
1	6	2	4	4	4	4	2	6	3	5	5	3	24	24
2	5	3	3	5	5	3	4	4	5	3	4	4	26	22
3	6	2	4	4	5	3	2	6	5	3	5	3	27	21
4	4	4	4	4	4	4	4	4	4	4	4	4	24	24
5	3	5	3	5	3	5	8	0	3	5	3	5	23	25
6	7	1	3	5	3	5	2	6	3	5	3	5	21	27
Total by Levels Group	31	17	21	27	24	24	22	26	23	25	24	24	Total 145	143

[a] B4:BC5(M:F)≠BC1(M:F), BC3(M:F), and BC6(M:F)

in these cases, when the relationship between the involved groups' means was being evaluated, the criterion for rejecting the null hypothesis was changed to the .001 probability level (Cochran and Cox, 1957; Lindquist, 1953; and Winer, 1962).

Three comments about mechanics of presentation are apropos. First, only prime data are reported. Second, the tables contain rounded numbers; unrounded numbers were used in the statistical analyses. Third, the reader may consult the last section of this chapter for a complete specification of details about terminology and symbolization. Briefly, the levels (B) groups are the several IQ X CA groups; the base cell (BC) groups are the groups formed by the six combinations of the amount of material and practice distribution variants--here, levels are ignored; and levels X base cell (B X BC) groups are the base cell (BC) groups within the levels (B) groups.

Relationships Among Subject Characteristics

Presented in Tables 4 through 8 are results of the statistical analysis of the subject data. Table 4 (cited on the preceding page) contains evidence about the sex distribution; Tables 5 through 8, evidence about MA, CA, and IQ. The conditions and the relevant evidence are cited in subsequent paragraphs. In this citation of evidence, the pertinent table number and factor are presented in parentheses.

Condition 1. Homogeneity of the sex distribution among the several levels groups.--The frequencies of boys and girls in the several levels groups were equivalent (Table 4, B groups).

Condition 2. Homogeneity of the sex distribution among the base cell groups, levels ignored.--The frequencies of boys and girls in the several base cell groups did not differ (Table 4, BC groups).

Condition 3. Homogeneity of the sex distribution among the base cell groups within each levels group.--Excepting the intermediate superior (B4) group, the frequencies of boys and girls in the base cell groups within the several levels groups were equivalent. Within the B4 group, the ratio of eight boys to no girls in base cell group 5 differed from the corresponding ratio in base cell group 1 (two boys, six girls), base cell group 3 (two boys, six girls), and base cell group 6 (two boys, six girls) (Table 4, BC groups within B groups).

Table 5

Results of Analyses of Variance Among Mean Mental Ages, Chronological Ages, or Intelligence Quotients: Subjects Classified by Major Levels Group and Base Cell Group

Source of Variance	Mental Age df	Mental Age Mean Square	Intelligence Level df	Intelligence Level Mean Square	Chronological Age df	Chronological Age Mean Square
Total	143	127.33	143	574.19	287	1222.02
Cells	17	206.45	17	4447.25	35	9056.01
B	2	1364.75***	2	37548.13**	5	61767.51***
BC	5	55.92	5	26.53	5	275.65
B X BC	10	50.06	10	37.44	25	269.78**
Error	126	116.54	126	51.63	252	133.96

** Probability level of associated F-ratio <.01.
*** Probability level of associated F-ratio <.001.

Condition 4. Homogeneity of mean MA among the retarded (B1), younger normal (B2), and youngest superior (B3) groups.--A difference occurred in one comparison of the MA control groups' MA's (Table 5, B). The younger normal (B2) group had a lower mean MA than the youngest superior (B3) group; the remaining pairs of means were equivalent (Table 6).

Condition 5. Homogeneity of mean MA among the base cell groups, levels ignored.--The mean MA's of the several base cell groups did not differ (Table 5, BC).

Condition 6. Homogeneity of mean MA among the base cell groups with the several levels groups.--The base cell groups within the several levels groups were equivalent in mean MA (Table 5, B X BC).

Condition 7. Heterogeneity of mean IQ among the retarded (B1), younger normal (B2), and youngest superior (B3) groups.--The MA control groups differed in mean IQ (Table 5, B). The youngest superior (B3) group mean was higher than the younger normal (B2) group mean; both of these means were higher than the retarded (B1) group mean (Table 6).

Condition 8. Homogeneity of mean IQ among the base cell groups, levels ignored.--The mean IQ's of the several base cell groups did not differ (Table 5, BC).

Condition 9. Homogeneity of mean IQ among the base cell groups within the several levels groups.--The mean IQ's of the base cell groups within the levels groups were equivalent (Table 5, B X BC).

Table 6

Results of *t*-tests of Differences Between Pairs of Mean Mental Ages, Chronological Ages, or Intelligence Quotients: Subjects Classified by Major Levels Group

Variable	Comparison	$F(S^2/S^2)$	$\bar{X}-\bar{X}$	*t*-ratio	Relationship Between Means
Mental Age	B1:B2	1.16	6.77	2.184	B1=B2
	B1:B3	1.03	3.75	1.157	B1=B3
	B2:B3	1.20	10.52	3.372**	B2<B3
Intelligence Quotient	B1:B2	1.04	28.04	14.995***	B1<B2
	B1:B3	1.69	55.93	26.136***	B1<B3
	B2:B3	1.63	27.89	12.069***	B2<B3
Chronological Age	B1:B2	2.12**	59.07	17.528***	B1>B2
	B1:B3	2.34**	75.73	21.810***	B1>B3
	B1:B4	1.41	54.69	15.025***	B1>B4
	B1:B5	1.26	3.06	0.732	B1=B5
	B1:B6	1.04	0.04	0.010	B1=B6
	B2:B3	1.10	16.66	6.311***	B2>B3
	B2:B4	1.50	4.38	1.450	B2=B4
	B2:B5	2.68**	62.13	16.975***	B2<B5
	B2:B6	2.20**	59.11	17.284***	B2<B6
	B3:B4	1.66	21.04	7.230***	B3<B4
	B3:B5	2.96***	78.77	21.820***	B3<B5
	B3:B6	2.44**	75.77	22.484***	B3<B6
	B4:B5	1.78	57.75	14.808***	B4<B5
	B4:B6	1.47	54.73	14.872***	B4<B6
	B5:B6	1.21	3.02	0.720	B5=B6

** $P < .01$
*** $P < .001$

Condition 10. Heterogeneity of mean CA among the following: retarded (B1), younger normal (B2) and youngest superior (B3) groups; youngest superior (B3), intermediate superior (B4), and oldest superior (B6) groups; and the younger normal (B2) and the older normal (B5) groups.--In the several sets of comparisons, the mean CA's differed in the expected directions (Table 5, B, and Table 6).

Condition 11. Homogeneity of mean CA among the retarded (B1), older normal (B5), and oldest superior (B6) groups and between the younger normal (B2) and the intermediate superior (B4) groups.--In both sets of comparisons, the groups were equivalent in mean CA (Table 5, B, and Table 6).

Condition 12. Homogeneity of mean CA among the several base cell groups, levels ignored.--The several base cell groups had equivalent mean CA's (Table 5, BC).

Condition 13. Homogeneity of mean CA among the several base cell groups within the levels groups.--Differences in mean CA were present among base cell groups within levels groups (Table 5, B X BC). These differences were located within the oldest superior (B6) group (Table 7, BC). Base cell groups 2 and 3 had lower means than base cell group 5. The means of all other pairs of base cell groups were homogeneous (Table 8).

Summary of Relationships Among Subject Characteristics

The statistical data referred to above would seem to warrant the following conclusions about the population or populations sampled. On the whole, the distributions of males and females are homogeneous. The retarded, normal, and superior MA control subjects differ in the expected directions in terms of IQ and CA; also, the younger normal subjects have lower MA's than the youngest superior subjects. The retarded, older normal, and oldest superior subjects are similar in CA; so are the younger normal and intermediate superior subjects. Generally, the subjects in the several base cell groups are homogeneous with respect to the subject variables.

Tasks

Two types of tasks were used to elicit learning performance. The nature of each type was defined primarily by variants of the task meaningfulness variable. Presented in the ensuing discussion are definitions of terms, task selection criteria, description of the tasks, and evidence about the equivalence of difficulty levels among tasks.

Definitions of Terms

For the purposes of this investigation, the following definitions of terms were employed in reference to the tasks.

1. Learning performance. Change in the response measure in the expected direction as a function of repetition (McGeoch and Irion, 1952).

2. Meaningfulness. Extent of a logical relationship existing among task materials (Guilford, 1927).

Table 7

Results of Analyses of Variance Among Mean Chronological Ages: Subjects Classified by Base Cell Subgroup Within Major Levels Group

Source	df	Mean Square Within B1	Within B2	Within B3	Within B4	Within B5	Within B6
Total	47	181.30	85.61	77.50	128.70	229.03	188.74
BC	5	320.60	69.74	55.73	129.49	441.84	607.14**
Error	42	164.72	87.50	80.09	128.60	203.69	138.93

** Probability level of associated F-ratio <.01.

Table 8

Results of *t*-tests of Differences Between Pairs of Mean Chronological Ages: Subjects Classified by Base Cell Subgroup Within the B6 Major Levels Group

Comparison	$F(S^2/S^2)$	$\overline{X}$-$\overline{X}$	*t*-ratio	Relationship Between Means
BC1:BC2	9.78**	8.24	1.515	BC1=BC2
BC1:BC3	7.79**	7.00	1.426	BC1=BC3
BC1:BC4	1.22	4.13	1.672	BC1=BC4
BC1:BC5	12.72**	14.50	2.362	BC1=BC5
BC1:BC6	43.39***	7.38	0.668	BC1=BC6
BC2:BC3	1.26	1.24	0.178	BC2=BC3
BC2:BC4	8.00**	12.37	2.249	BC2=BC4
BC2:BC5	1.30	22.74	2.893**	BC2<BC5
BC2:BC6	4.44	15.62	1.293	BC2=BC6
BC3:BC4	6.37	11.13	2.239	BC3=BC4
BC3:BC5	1.63	21.50	2.866**	BC3<BC5
BC3:BC6	5.57	14.38	1.213	BC3=BC6
BC4:BC5	10.40**	10.37	1.675	BC4=BC5
BC4:BC6	35.48***	3.25	0.294	BC4=BC6
BC5:BC6	3.41	7.12	0.574	BC5=BC6

** P< .01
*** P< .001

a. Logically related task materials. Task materials which are arranged according to a pre-established pattern. They are amenable to organization.

b. Non-logically related task materials. Task materials which are arranged in a random sequence rather than according to a pre-established pattern. They are not amenable to organization.

Task Selection Criteria

The task characteristics were determined primarily by the meaningfulness variable. In addition, the task characteristics were influenced by other aspects of the investigation. Generally, these aspects included the following: the nature of the dimensions of the practice variables, the characteristics of the subjects, and the exigencies of research arrangements within the school situation. These aspects necessitated the task selection criteria listed below.

1. Group administration. The task had to be such that it could be administered to small groups of subjects.

2. Interesting. The activity had to be one in which the subject would not dislike participating.

3. Novel. The task (i.e., the materials and/or the manner in which they were manipulated) had to be one with which it was believed that the subject had had no specific prior experience. However, the task could not be so removed from the subject's realm of experience that its uniqueness would constitute a disturbing factor.

4. Appropriate time length. Performance on the tasks could not be so time consuming that participation in the investigation would make unreasonable demands upon the time of the subjects who concurrently were engaged in academic work.

5. Movable equipment. The equipment and/or test material had to be such that they could be moved from location to location and used in rooms in which there were no special facilities.

6. Non-fatiguing. The activity had to be such that an adequate sample of the subject's performance could be obtained before he became fatigued.

7. Wide range of possible scores. The activity had to be such that subjects widely varying in CA and IQ all could respond with some improvement of performance; i.e., it had to be neither too hard nor too easy and to have a scoring continuum over a relatively large number of trials.

Description of the Tasks

As noted above, the two meaningfulness variants were the primary dimensions on which the tasks were based. The corresponding tasks were designated logical and non-logical, respectively. Four equated forms of each type were required to correspond to the four recitation variants. The resulting eight tasks were designated L-I, L-II, I-III, L-IV, NL-I, NL-II, NL-III, NL-IV. These tasks, based on the conventional paired associate technique, each consisted of nine syllable-digit pairs. The stimulus units were three-letter nonsense syllables (consonant, vowel, consonant) which had low association value. The response units were three-digit numbers. The basic task materials are cited in Figure 3.

Each list contained three categories of stimulus syllables; within each category, the initial consonant was constant. Controlled as nearly as possible among tasks was the frequency with which the medial vowels and final consonants occurred singly and in combination as blends. The letters, *q*, *s*, and *x* were not feasible initial consonants. And so, the ratio of 18 feasible initial consonants to 24 categories of syllables necessitated the repetition of six initial consonants. Selected for repetition were *b*, *h*, *j*, *v*, *w*, *z*. These repetitions were balanced between the logical and non-logical tasks. An attempt was made not to repeat a consonant within any one task. In addition, when an initial consonant repetition occurred between tasks within the logical and non-logical series, efforts were made to prevent repetition of any single initial consonant-medial vowel combination.

Meaningfulness was defined as the extent of logical relationship existing among task materials. The ramifications of the two meaningfulness variants for the task materials are described below.

Within each of the four tasks of the logical series, the materials were organized according to a principle or a pre-established relationship or pattern. Specifically, the principle was this: the initial consonant defining each category of stimulus syllables was associated with an initial combination of two numbers which defined the category of response digits. That is, the three stimulus syllables which had the same initial consonant were associated with three response digits which had the same initial

Figure 3

Basic Task Materials Used in the Logical and Non-logical Tasks

	L-I	L-II	L-III	L-IV
Logical Tasks	n (48)	v (85)	j (26)	z (35)
	nop - 487	vot - 857	jow - 264	zud - 352
	nur - 485	vac - 852	jek - 261	zap - 357
	nem - 482	vef - 854	jid - 267	zob - 354
	h (75)	l (17)	w (61)	r (12)
	hib - 739	lup - 173	wug - 613	ros - 125
	hev - 734	leq - 175	woc - 615	rog - 128
	haj - 736	lar - 179	wab - 619	ral - 121
	b (29)	f (59)	c (94)	g (81)
	bas - 293	fij - 591	cam - 942	gej - 816
	bic - 291	fod - 598	cip - 946	gix - 813
	boz - 298	fub - 596	cuv - 948	guz - 819
Non-logical Tasks	z	y	v	w
	zoq - 614	yux - 853	vul - 382	wup - 692
	zaw - 379	yem - 136	ven - 425	wec - 164
	zic - 586	yik - 691	vah - 617	wog - 457
	t	k	h	p
	tus - 467	koj - 947	hif - 521	piv - 325
	tib - 753	kel - 728	hud - 986	pof - 249
	tep - 298	kag - 365	heb - 268	pej - 816
	m	d	b	j
	mev - 921	daq - 274	bap - 139	jad - 538
	mog - 142	dos - 589	bim - 463	jix - 943
	muj - 835	dut - 412	bov - 754	juk - 721

two-number combinations. For example, in the L-I task, all stimulus syllables beginning with n were associated with response digits beginning with 48, etc.

The task materials in the non-logical series were not organized according to any pre-established principle. The initial consonant defining each category of stimulus syllables was not associated with any particular combination of numbers.

The final numbers in the response digits of the logical series and all numbers in the response digits of the non-logical series were selected arbitrarily. In this arbitrary selection process, efforts were made to insure that the following conditions obtained: no consistent number sequence existed, the frequency of number repetitions within or among task was balanced, and no combination of numbers was repeated. Through error, exceptions to the latter conditions occurred: viz., pej--816, qej--816, tep--298, boj--298.

The several tasks included 40 trials. Each trial involved a list of syllable-digit pairs presented on a separate page. In addition to the 40 trials, test lists were inserted after every 10 trials in order to obtain a response measure of learning performance. The task materials were combined into task booklets which included 40 trials and four test lists. Twenty-four classes of task booklets were necessary. One class of task booklets corresponded to each combination of the meaningfulness, recitation, and amount of material variables.

Two blank pages were inserted in the tasks booklets after every five trials--the point at which the subjects who received the distributed practice variant stopped and performed the interpolated picture naming activity. Also, two blank pages were placed before and two blank pages were placed after each test list.

The letter-digit pairs were typed in pica size type. The trials and test lists were reproduced by mimeograph on 8 1/2 inches by 11 inches sheets of white paper. Each task booklet was constructed by stapling together the several trial and test list pages plus the inserted blank pages.

The task materials are listed in Appendix C. The form in which a task was administered to the subjects differed from that in which it is presented in Appendix C. In the appendix, for any one meaningfulness--

recitation combination, the three sets of stimulus--response items for the amount of material variants are listed in parallel columns. These three sets of stimulus--response items appeared in separate task booklets during the investigation proper. Also not included in the appendix are the blank pages associated with practice distribution and with testing.

Equivalence of Task Difficulty

In order to examine possible differential effects of the several conditions of practice on learning performance, the several syllable-digit lists, per se,had to be demonstrated to be equivalent in difficulty. While the lists were being developed, every attempt was made to avoid and eliminate systematic biases by inspecting the materials and by making corrections after each administration of the materials in the several pilot testing sessions. When the final forms were completed, equivalence of list or task difficulty was evaluated by the following procedures. Four additional pilot test groups were selected. Each group was administered two corresponding tasks. That is, each group was given one of the four logical tasks and one of the four corresponding non-logical tasks; e.g., one group received L-I and NL-I, another received L-II and NL-II, etc. All eight tasks were administered under the same conditions. An attempt was made to keep these conditions as neutral as possible by using the following procedures: the total nine letter-digit pairs were presented each trial, no interpolated rest period was administered, no recitation was employed, and no comment was made about meaningfulness or the existence of an underlying principle. Test lists were administered after trials 10, 20, and 30. Lindquist's (1953) Type I design was used to analyze obtained data reflecting performance at each practice level. This procedure, analyzing separately data obtained at each practice level or on each test list, was followed for this reason. On an a priori basis, it was considered most meaningful to determine whether the effect of the several practice variables on learning performance was a function of practice level. When the analyses of the experimental data were performed, the load potential of the computers was not sufficient to examine concomitantly data obtained at the several practice levels. Therefore, to be consistent, the pilot test data were examined separately according to test lists also.

Table 9 contains the results of the statistical analyses. The probabilities of the pertinent F-ratios were greater than .05; therefore, the null hypotheses were rejected. The several lists were considered equivalent in difficulty at each stage of practice when all practice variables were held constant.

Table 9

Results of Analyses of Variance Among Pilot Subjects' Mean Performance on the Eight Syllable--Digit Lists

Source	df	Mean Square Test 1	Test 2	Test 3
Total	39	3.50	5.44	6.09
Between Subjects	19	4.89	8.08	9.60
Form (I, II, III, IV)	3	8.09	7.36	16.57
Error (b)	16	4.29	8.21	8.30
Within Subjects	20	2.18	2.92	2.75
Meaningfulness (L, NL)	1	0.62	3.02	1.60
Form X Meaningfulness	3	4.89	1.89	3.87
Error (w)	16	1.76	3.11	2.61

Practice Variables

Given the two types of tasks, the recitation type, amount of material, and practice distribution variables defined the characteristics of practice during task performance. In other words, the nature of the activity involved in practice was determined by the recitation variants, the manner in which the material was divided for practice was determined by the amount of material variants, and the way in which the time allocated for practice was divided was defined by the practice distribution variants. Essentially, the procedure used to administer the practice variables involved presenting each of the recitation variants for both the logical and non-logical tasks within the framework of the combination defined by the overlap of the amount of material and practice distribution variants. Presented below are the definitions of terms and the procedures germane to each of the three practice variables.

Definitions of Terms

For the purposes of this investigation, the following definitions of terms were employed in reference to the practice variables.

1. Recitation type. Manner in which the material to be learned is recalled in the absence of exposure or presentation of the material (McGeoch and Irion, 1952, p. 507).
    a. Reading--no recitation. Method in which the subject reads the material aloud during presentation but does not recall it in the absence of the material.
    b. Reading--verbal recitation. Method in which the subject reads the material aloud during presentation and recalls it orally with prompting in the absence of the material.
    c. Reading--written recitation. Method in which the subject reads the material aloud during presentation and recites it by writing with prompting in the absence of the material.
    d. Reading--verbal and written recitation. Method in which the subject reads the material aloud during presentation and recalls it orally and by writing with prompting in the absence of the material.
2. Amount of material. Manner in which the material to be learned is divided for practice or repetition (McGeoch and Irion, 1952, p. 599).
    a. Whole method. Method in which the total amount of material to be learned is repeated from beginning to end during each trial.
    b. Pure parts method. Method in which the total amount of material to be learned is divided into equal parts. Each part is practiced separately. Then, the parts are combined and practiced as a whole.
    c. Progressive parts method. Method in which the total amount of material to be learned is divided into equal parts. The first and second parts are practiced separately and then combined and practiced as a unit. Next, the third part is practiced separately and then combined with the first and second combined parts and practiced as a unit. This progressive addition of parts is continued until the whole is encompassed.
3. Practice Distribution. Manner in which the practice sequences or repetitions are timed (Hovland, 1951, p. 636).
    a. Massed practice. Method in which each trial or repetition is presented successively to the subject with no interpolated time interval.

b. Distributed practice. Method in which separate trials or blocks of n trials or repetitions are separated by interpolated constant time intervals.

Recitation Type

Recitation type refers to the manner in which the material to be learned was recalled in the absence of exposure to the material. Four variants were used: no recitation (control), verbal recitation, written recitation, and verbal and written recitation. These were labeled I, II, III, and IV, respectively, and were represented by four equated tasks.

Recitation was employed on 80% of the 40 trials; reading was employed on 20%. This 80%-20% division was the one which Gates (1917) found most effective in his study of the usefulness of several ratios of reading to verbal recitation. The lists of syllable-digit pairs were presented in terms of reading lists and recitation lists. The reading lists contained both the stimulus syllables and the response digits. The recitation lists contained only the stimulus syllables.

When he administered the reading lists, the investigator presented each syllable-digit pair separately. The investigator read aloud each syllable-digit pair while the subject looked at the pair on the task booklet page. Then the investigator read aloud the stimulus syllable and the subject read aloud the response digit while he looked at the pair on the task booklet page.

When he administered the recitation lists, the investigator repeated this sequence with the exception that he hesitated for a two-second time interval after reading the stimulus syllable the second time. During this time interval, the subject was required to recite the response digit. That is, he supplied the response digit in the manner appropriate to the recitation variant which he was using. After this, the investigator repeated the response digit. The subjects receiving the control variant, reading--no recitation, were administered the procedure for the reading lists in conjunction with all lists. Their task materials contained both the stimulus syllables and the response digits; these syllable-digit pairs were arranged in the same sequence as the stimulus syllables alone for subjects receiving the other recitation variants.

When he presented the test lists to the subjects receiving all recitation variants, the investigator presented only the stimulus syllables. The subject was required to supply in writing the appropriate response digits.

Figure 4 contains the schedule of trials on which the reading, recitation, and test lists were presented.

Figure 4

Schedule for the Reading, Recitation, and Test Lists

Recitation Variant	Trials 1,6,11,16 21,26,31,36	Trials[a] 2,3,4,5; 7,8,9,10; 12,13,14,15; 17,18, 19,20; 22,23,24,25; 27,28,29,30; 32,33, 34,35; 37,38,39,40.
I (L-I, NL-I) Reading--no recitation	Read	Read
II (L-II, NL-II) Reading--verbal recitation	Read	Recite orally
III (L-III, NL-III) Reading--written recitation	Read	Recite in writing
IV (L-IV, NL-IV) Reading--verbal and written recitation	Read	Recite orally and in writing

[a] Test lists were administered in each case after trials 10,20,30,40

Amount of Material

Amount of material refers to the manner in which the material of the task was divided for practice. Three variants were employed: whole method, pure parts method, and progressive parts method. To obtain the parts, the whole lists of nine syllable-digit pairs were divided into three equal sections. These were designated parts 1, 2, and 3, respectively.

To accomplish this trichotomy, each base list cited in Figure 3 was rearranged so that each third contained one syllable-digit pair from each of the three categories which comprised a list. These were numbered from one to nine. To ensure that the pairs occurred with equal frequency in each position with each three-unit part, these number sequences were employed: 1 2 3, 2 3 1, 3 1 2, 3 2 1, 2 1 3, 1 3 2. Two sequences, 3 1 2 and 2 1 3, were selected arbitrarily for the reading lists and test lists, respectively. The digits, 3 and 6 were added to the several number sequences to obtain the number sequences for the second and third parts. Cited in Figure 5 and the sequences or orders of arrangement obtained in this way for the several trials.

Subjects receiving the whole method were administered the entire list of nine pairs of each of the 40 trials. The test list administered after trials 10, 20, 30, and 40 was based on the none pairs.

Subjects receiving the pure parts method were administered the material according to the following rrial schedule. Part 1 (first three pairs) was repeated for trials 1 through 10. After trial 10, the test list based on the part 1 pairs was administered. Part 2 (second three pairs) was repeated for trials 11 through 20. After trial 20, the test list based on the part 2 pairs was administered. Part 3 (third three pairs) was repeated for trials 21 through 30. After trial 30, the test list based on the part 3 pairs was administered. Parts 1, 2, and 3 combined (whole list of nine pairs) were repeated for trials 31-40. After trial 40, the test list based on the total list of nine pairs was administered.

Subjects receiving the progressive parts method were administered the material according to the following trial schedule. Part 1 (first three pairs) was repeated for trials 1 through 10. After trial 10, the test list based on the part 1 pairs was administered. Part 2 (second three pairs) was repeated for trials 11 through 20. After trial 20, the test list based on the part 2 pairs was administered. Parts 1 and 2 (first six pairs) was combined for trials 21 through 25. Part 3 (third three pairs) was administered for trials 26 through 35. After trial 30, the test list based on the final three pairs was administered. Parts 1, 2, and 3 (whole list of nine pairs) was administered from trials 36 through 40. After trial 40, the test list based on the total list of nine pairs was administered.

Figure 5

Sequences for Arrangement of Syllable-digit Pairs
Classified by Parts Within Lists

List	Reading List	Test List	Recitation List					
Trials Used	1,6 11,16 21,26 31,36	After Trials 10,20 30,40	2,5 12,15 22,25 32,35	3 13 23 33	4 14 24 34	7,10 17,20 27,30 37,40	8 18 28 38	9 19 29 39
Part 1	3 1 2	2 1 3	1 2 3	2 3 1	3 1 2	3 2 1	2 1 3	1 3 2
Part 2	6 4 5	5 4 6	4 5 6	5 6 4	6 4 5	6 5 4	5 4 6	4 6 5
Part 3	9 7 8	8 7 9	7 8 9	8 9 7	9 7 8	9 8 7	8 7 9	7 9 8

Practice Distribution

Practice distribution refers to the manner in which the practice sequences were timed. The variants were massed and distributed practice. Subjects receiving massed practice were administered the 40 trials without any interpolated time intervals. For subjects receiving distributed practice, two-minute intervals were interpolated after each block of five trials: _to wit_, after trials 5, 10, 15, 20, 25, 30, and 35. To minimize subvocal or uncontrolled practice during these interpolated intervals, the subjects were required to spend the entire time naming pictures (Bryngelson and Glaspey, 1951) presented by the investigator. Exposed during this time were the two blank pages which were inserted in the test booklets at the points in the trials--test sequence at which interpolated time intervals were scheduled to occur.

Practice Variable by Task Schedule

The subjects in the six base cell groups were administered combinations of amount of material and practice distribution variants in conjunction with the several tasks reflecting combinations of the task meaningfulness and recitation type variants. The schedule was based on the irregular number sequences cited below.

Sequence	First task	Second task	Third task	Fourth task	Fifth task	Sixth task	Seventh task	Eighth task
Combination of Practice Variants	1	4	3	2	6	5	3	6
	2	5	1	3	4	6	4	2
	3	1	4	6	5	2	1	5
	4	6	5	1	2	3	6	3
	5	2	6	4	3	1	5	1
	6	3	2	5	1	4	2	4

The tasks were administered in this sequence: first task, L-I; second task, NL-I; third task, L-III; fourth task, NL-III; fifth task, L-II; sixth task, NL-II; seventh task, L-IV; eighth task, NL-IV. The combinations of variants were numbered in this fashion: 1, C1D1; 2, C1D2; 3, C2D1; 4, C2D2; etc. The practice variable by task schedule which resulted when these number sequences were rearranged in illustrated in Figure 6.

Specific Procedures

Administering the tasks and the practice variables involved a rather complex set of detailed or specific procedures and directions. In Figure 7, the procedures are summarized in terms of the basic paradigm for the investigation. Quoted below is the set of detailed directions and procedures which the investigators used as they presented the several task and practice variants to the subjects.

Figure 6-Practice Variable by Task Schedule

Task Sequence Task Name	First L-I	Second ML-I	Third L-III	Fourth ML-III	Fifth L-II	Sixth ML-II	Seventh L-IV	Eighth ML-IV
Base Cell Group 1	D1C1	D3C2	D1C2	D2C1	D2C1	D3C1	D2C2	D3C1
Base Cell Group 2	D1C2	D2C2	D3C2	D3C2	D3C1	D2C1	D1C1	D1C2
Base Cell Group 3	D2C1	D3C1	D1C1	D1C1	D3C2	D2C2	D1C2	D2C2
Base Cell Group 4	D2C2	D1C2	D2C1	D1C2	D1C1	D3C2	D3C1	D3C2
Base Cell Group 5	D3C1	D2C1	D2C2	D3C1	D1C2	D1C1	D3C2	D2C1
Base Cell Group 6	D3C2	D1C1	D3C1	D2C2	D2C2	D1C2	D2C1	D1C1

Figure 7-Summary of Procedures Related to the Several Practice and Task Variables

<table>
<tr><td colspan="2">Amount of Material</td><td colspan="2">(D1)
(Whole list: Trials 1-40)</td><td colspan="2">(D2)
Part 1: Trials 1-10
Part 2: Trials 11-20
Part 3: Trials 21-30
Part 1+2+3: Trials 31-40</td><td colspan="2">(D3)
Part 1: Trials 1-10
Part 2: Trials 11-20
Part 1+2: Trials 21-25
Part 3: Trials 26-35
Part 1+2+3: Trials 36-40</td></tr>
<tr><td colspan="2">Distribution of Practice</td><td>(C1)
No interpolated rest period</td><td>(C2)
Rest period interpolated: trials 5,10, 15,20,25,30,35</td><td>(C1)
No interpolated rest period</td><td>(C2)
Rest period interpolated trials 5,10, 15,20,25,30,35</td><td>(C1)
No interpolated rest period</td><td>(C2)
Rest period interpolated: trials 5,10, 15,20,25,30,35</td></tr>
<tr><td rowspan="4">Meaningfulness/Recitation Variants</td><td>I
(LI,NLI)</td><td colspan="6">Read: Trials 1,6,11,16,21,26,31,36.
Read: Trials 2,3,4,5;7,8,9,10;12,13,14,15;17,18,19,20;22,23,24,25;27,28,29,30;32,33,34,35; 37,38,39,40.
Test: After trials 10,20,30, and 40.</td></tr>
<tr><td>II
(LII,NLII)</td><td colspan="6">Read: Trials 1,6,11,16,21,26,31,36.
Recite verbally: Trials 2,3,4,5:7,8,9,10;12,13,14,15;17,18,19,20;22,23,24,25;27,28,29,30; 32,33,34,35;37,38,39,40.
Test: After trials 10,20,30, and 40.</td></tr>
<tr><td>III
(LIII,NLIII)</td><td colspan="6">Read: Trials 1,6,11,16,21,26,31,36.
Recite by writing: Trials 2,3,4,5;7,8,9,10;12,13,14,15;17,18,19,20;22,23,24,25;27,28,29,30; 32,33,34,35;37,38,39,40.
Test: After trials 10,20,30, and 40.</td></tr>
<tr><td>IV
(LIV,NLIV)</td><td colspan="6">Read: Trials 1,6,11,16,21,26,31,36.
Recite verbally and by writing: Trials 2,3,4,5;7,8,9,10;12,13,14,15;17,18,19,20;22,23,24,25; 27,28,29,30;32,33,34,35;37,38,39,40.
Test: After trials 10,20,30, and 40.</td></tr>
</table>

Directions and Procedures for Administering the Tasks and Practice Variants to the Subjects

(Constant: all subjects.)

Today, we are going to work with pairs of words and numbers. A pair is made of two things which always go together. They are related. (Show subject a letter--digit pair.) Here is a pair. The word is ________ and the number is ________. They go together. Here, I have nine pairs of words and numbers which go together. Your job is to learn the pairs, the words and numbers which are related--the ones which always go together. You will know the numbers. You have worked with them before in your classroom. The words are new words. You probably never have seen them before. I'll tell you what the new words are and then you will learn the numbers which go with the words. And I'll tell you something else.

(Variable: Choose the appropriate alternate according to the meaningfulness variant to be administered.)

Non-logical Lists

These words and numbers are not related in a certain way. There is not a rule about how these words and numbers go together. There is no trick. You will just learn the words and the numbers which go together.

Logical Lists

These words and numbers are related in a certain way. There is a rule about how these words and numbers go together. It's a kind of trick. If you figure out this trick, it will help you to learn much faster the words and the numbers which go together.

(Constant: all subjects.)

Reading Lists

Now, here's how we'll work with the words and numbers. First, we will go through the reading list. We'll see the pairs of words and numbers together. Your job is to learn the numbers beside each word. I'll read the word and the number and then the word again and you read the number. We'll do this several times. The pairs in the reading list will always be in the same order. And, we'll go rather fast.

Recitation Lists

Then, we'll go through the recitation list. The pairs in this list are the same as those in the reading list but they are all mixed up. In other words, the pairs will not be in the same order as those in the reading lists; but the same word will always go with the same number.

I'll read the words and numbers just like I did with the reading list. After I read the word the second time your job is to--

(Variable: choose the appropriate alternate according to the recitation variant to be administered.)

(NL-I, L-I:) read the right number --
(NL-II, L-II:) say the missing right number --
(NL-III, L-III:) write the missing right number in the blank space --
(NL-IV, L-IV:) say and write the missing right number in the blank space --

(Constant: all subjects.)

which goes with each word. Try real hard.

Test Lists

After every 10 pages of the booklet--10 reading and recitation lists--we'll have a test list for the word and number pairs you have been working on. These will have only the words on them. Your job will be to supply the numbers which go with the words. I'll read the words only and you'll write the missing number which goes with each word. Now, we'll have to go sort of fast. We have about two seconds for each pair. And so, you will have to pay close attention, think fast, and get the numbers quickly. This may seem kind of hard at first but after we do it a few times, you'll begin to remember some of the pairs. You'll get more and more right each time. Just try your best to learn the numbers which go with the words.

(Variable: choose the correct alternate according to the meaningfulness variant to be administered.)

Non-logical lists

Remember, there is no trick. You just have to learn the numbers and words which go together.

Logical lists

Remember, there is a trick. Try to figure it out because it will help you learn faster the numbers and words which go together.

(*Variable*: choose the correct alternate according to the amount of material X distribution practice combination to be administered.)

D1C1: Whole method--massed practice

There are nine pairs in each list. We will go through the whole list of nine pairs each time. We will go straight through without stopping.

D1C2: Whole method--distributed practice

There are nine pairs in each list. We will go through the whole list of nine pairs each time. We will stop after every five times and look at some pictures for awhile.

D2C1: Pure parts method--massed practice

There are nine pairs in each list. We will divide the whole list of nine pairs into three parts. We will go through the first three pairs several times; we will go through the second three pairs several times; we'll go through the third three pairs several times; then, we will put them all together and go through the whole list of nine pairs several times. We will go straight through without stopping.

D2C2: Pure parts method--distributed practice

There are nine pairs in each list. We will divide the whole list of nine pairs into three parts. We will go through the first three pairs several times; we will go through the second three pairs several times; we will go through the third three pairs several times; then, we will put them all together and go through the whole list of nine pairs several times. We will stop every five times and look at some pictures for awhile.

D3C1: Progressive parts method--massed practice

There are nine pairs in each list. We will divide the whole list of nine pairs into three parts. We will go through the first three pairs several times; we will go through the second three pairs several times; then, we will put the two parts together and go through the six pairs several times. Next, we will go through the third three pairs several times. Then, we will put them all together and go through the whole list of nine pairs several times. We will go straight through without stopping.

D3C2: Progressive parts method--distributed practice

There are nine pairs in each list. We will divide the whole list of nine pairs into three parts. We will go through the first three pairs several times; we will go through the second three pairs several times; then, we will put the two parts together and go through the six pairs several times. Next, we will go through the third three pairs several

2

times. Then, we will put them all together and go through the whole list of nine pairs several times. We will stop after every five times and look at some pictures for awhile.

(Constant: all subjects.)

Does anyone have questions about what we are going to do? (Paraphrase, if necessary, the directions pertaining to reading and recitation lists and answer all questions.)

Now, you know what we are going to do. All right, here is the first reading list. We'll have to go fast.

(Variable: choose the appropriate alternate according to the meaningfulness variant to be administered.)

Logical lists

Remember, look for the trick.

Non-logical lists

Remember, there is no trick.

(Constant: all subjects.)

(Administer Trial 1, reading list).

Now, here is the recitation list. Remember what you are supposed to do. (Paraphrase directions appropriate for the specific recitation condition being employed). Also, remember these things. We'll have to go fast. Be sure to keep up with me. If you get behind, skip to the place where we are. If you can't find the place, tell me and I will help you. (Be sure that no one gets behind.) Also, in this part, the pairs are in mixed up order, but the same words and numbers always go together. Try to learn as many as you can.

(Variable: choose the appropriate alternate according to the meaningfulness variant to be administered.)

Logical lists

Remember, look for the trick.

Non-logical lists

Remember, there is no trick.

(Constant: all subjects.)

(On subsequent trials, continue to paraphrase the essential directions until it is certain that the subjects understand the procedures. Before each trial, restate: the need for speed, the set for the subject to learn as many letter-digit pairs as he can, and the comment about the presence or absence of the principle or relationship. Use directions and materials for the reading list on trials 1, 6, 11, 16, 21, 26, 31, 36. Use directions and materials for the recitation lists on trials 2, 3, 4, 5; 7, 8, 9, 10; 12, 13, 14, 15; 17, 18, 19, 20; 22, 23, 24, 25; 27, 28, 29, 30; 32, 33, 34, 35; 37, 38, 39, 40.)

(After trials 10, 20, 30, and 40, administer the test lists.) We have finished going through the reading and recitation lists ten times and it is time for a test list to see how many pairs of words and numbers you've learned. I'll read the word and you write the number in the blank space.

General Procedures

A schedule sheet was prepared for each subject. This sheet consisted of subject location data and information about the combination of variables administered to that subject in any one session. A representative example is contained in Figure 8.

The sessions in which massed practice was administered in combination with other variables were about 45 minutes long. When the eight two-minute interpolated time periods were used with the conditions involving distributed practice, the sessions were approximately one hour in length. The sessions were conducted in separate rooms of the subjects' schools. In general, the rooms were free from excessive or unusual noise or interruption during the session.

Each session involved small groups of six to ten subjects. These groups, termed administration groups, included subjects assigned to any particular base cell group from throughout a school (regardless of levels group) who were scheduled to receive the combination of variants administered during the session; thus, any one administration group contained representatives from different levels groups who were in corresponding base cell groups.

Figure 8

Subject Schedule Sheet

Subject code number ____________ Subject name ____________

Base cell group ____________ Teacher/Room # ____________

Subject # (in base cell group) ____________ School ____________

Task Sequence	First	Second	Third	Fourth
Task Name	L-I	NL-I	L-III	NL-III
Practice Variants				
Date administered				
Administrator				

Task Sequence	Fifth	Sixth	Seventh	Eighth
Task Name	L-II	NL-II	L-IV	NL-IV
Practice Variants				
Date administered				
Administrator				

Absentees were contacted as soon as possible.

An administration schedule by schools was employed. In general, about one week elapsed between sessions for each group of subjects. No particular order was used in developing the sequence of schools; however, once the sequence was established, it usually was repeated until the eight required sessions were completed. The several research personnel administered all sessions as they were scheduled.

The tasks were long; for some subjects, the requirements were rather difficult. The subjects were reassured when reassurance appeared indicated and verbal reinforcement was employed intermittently. Although a few exceptions occurred, on the whole, adequate rapport with the subjects was considered to be established and maintained.

Plan for Analysis of Results

Three topics encompass the considerations involved in analyzing and reporting the obtained data. These topics are the following: response measure, data organization, and statistical procedures. Pertinent details are presented below.

Response Measure

The response measure selected to reflect learning performance was the score, or number of items correctly completed, on the test lists administered after every 10 trials in the 40 trial sequence. Thus, four test scores, corresponding to the four practice levels, were available for each subject.

Data Organization

Classifying, preparing, analyzing, and reporting information implicit in the response measure involved manipulating a large mass of data. To facilitate the work, these data were reduced, or organized, in terms of alphanumeric symbols which were used as much as possible in the statistical analyses and tabular presentations. These symbols and their labels are listed below.

A, practice level: A1, scores on test list 1; A2, scores on test list 2; A3, scores on test list 3; A4, scores on test list 4.

B, levels: B1, retarded group--MA control; B2, younger normal group--MA control; B3, younger superior group--MA control; B4, intermediate superior group--CA control for younger normal (B2) MA control group; B5, older normal group--CA control for retarded (B1) MA control group; B6, oldest superior group--CA control for retarded (B1) MA control group.

M, task meaningfulness: M1, logically related task materials; M2, non-logically related task materials.

R, type of recitation: R1, reading--no recitation; R2, reading--verbal recitation; R3, reading--written recitation; R4, reading--verbal and written recitation.

D, amount of material: D1, whole method; D2, pure parts method; D3, progressive parts method.

C, distribution of practice: C1, massed practice; C2, distributed practice.

MR, extent of task meaningfulness X type of recitation: M1R1, reading--no recitation X logically related task materials; M2R1, reading--no recitation X non-logically related task materials; M1R2, reading--verbal recitation X logically related task materials; M2R2, reading--verbal recitation X non-logically related task materials; M1R3, reading--written recitation X logically related task materials; M2R3, reading--written recitation X non-logically related task materials; M1R4, reading--verbal and written recitation X logically related task materials; M2R4, reading--verbal and written recitation X non-logically related task materials.

MD, extent of task meaningfulness X amount of material: M1D1, whole method X logically related task materials; M2D1, whole method X non-logically related task materials; M1D2, pure parts method X logically related task materials; M2D2, pure parts method X non-logically related task materials; M1D3, progressive parts method X logically related task materials; M2D3, progressive parts method X non-logically related task materials.

MC, extent of task meaningfulness X distribution of practice: M1C1, massed practice X logically related task materials; M2C1, massed practice X non-logically related task materials; M1C2, distributed practice X logically related task materials; M2C2, distributed practice X non-logically related materials.

RD, type of recitation X amount of material: R1D1, whole method X reading--no recitation; R2D1, whole method X reading--verbal recitation; R3D1, whole method X reading--written recitation; R4D1, whole method X reading--verbal and written recitation; R1D2, pure parts method X reading--no recitation; R2D2, pure parts method X reading--verbal recitation; R3D2, pure parts method X reading--written recitation; R4D2, pure parts method X reading--verbal and written recitation; R1D3, progressive parts method X reading--no recitation, R2D3, progressive parts method X reading--verbal recitation; R3D3, progressive parts method X reading--written recitation; R4D3, progressive parts method X reading--verbal and written recitation.

RC, type of recitation X distribution of practice: R1C1, massed practice X reading--no recitation; R2C1, massed practice X reading--verbal recitation; R3C1, massed practice X reading--written recitation; R4C1, massed practice X reading--verbal and written recitation; R1C2, distributed practice X reading--no recitation; R2C2, distributed practice X reading--verbal recitation; R3C2, distributed practice X reading--written recitation; R4C2, distributed practice X reading--verbal and written recitation.

DC, amount of material X distribution of practice: D1C1, whole method X massed practice; D1C2, whole method X distributed practice; D2C1, pure parts method X massed practice; D2C2, pure parts method X distributed practice; D3C1, progressive parts method X massed practice; D3C2, progressive parts method X distributed practice.

S, sex: S1, males; S2, females.

IQ, intelligence quotient; MA, mental age; CA, chronological age.

Statistical Procedures

Basically the data were examined from three points of view: effects of the practice and task variables, levels variable held constant; effects of the practice and task variables within each levels group; effect of the levels variable, practice and task variables held constant. The procedures considered appropriate for these analyses are described below.

To insure homogeneity of variance and normality of the score distributions, all scores were transformed. The transformation formula used was $\sqrt{X + .5}$.

The effects of the practice and task variables were evaluated in this way. Analysis of covariance was used to examine relationships among means corresponding to the practice and task variables. At each practice level, analyses of covariance were performed for the total group of subjects with levels groups ignored and for the subjects within each levels group. The statistical model used to describe the data is cited in Figure 9. Because of the non-orthogonality of the data, all constants were estimated by a conventional least squares method and all tests were made under the assumption of fixed effects (Harvey, 1960; Winer, 1962). When F-ratios yielded by the analyses of main effects were significant, differences between the several pairs of means involved were evaluated. The Kramer multiple range test was employed in making these comparisons (Kramer, 1956; Winer, 1962).

The effect of the levels variable was evaluated in this way. A single factor analyses of variance model was used to examine the relationships among means reflecting the performance of subjects in the six major levels groups at the four practice levels. To make the paired comparisons, $\underline{t}$ tests were employed.

The .01 probability level was the criterion for rejecting the null hypothesis in all statistical tests. The .01 probability level was chosen on the basis of two considerations: the large numbers of degrees of freedom associated with the error terms and the large number of analyses. Briefly, the underlying reasoning[1] was the following. First, the response measure's precision was limited to some extent; on the other hand, the large samples and the statistical design resulted in highly precise or powerful statistical tests. Consequently, it was possible that the results would reflect statistical but not practical significance. Second, since so many statistical tests were being performed, the number of ostensibly significant statistics occurring by chance could be expected to be magnified To attenuate the possibility of these difficulties, the decision was made, *a priori*, to use the .01 probability level rather than the .05 probability level which conventionally is selected as the criterion for rejecting the null hypothesis. This is recognized to be a stringent criterion; and so, the basic statistical tables include designations of the .05 probability level for the information of readers who prefer a less conservative approach.

Attrition occurred to a limited extent during the several months of data collection. To maintain equal subclass frequencies, substitutions were made

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[1] See Edwards (1950), Lindquist (1953), McNemar (1955), Cochran and Cox (1957), and Winer (1962) for a discussion of the issues involved here.

Figure 9

Statistical Model: Analysis of the Effects of the Practice and Task Variables, Levels Variables Held Constant

$$Y_{ijklo} = b + M_i + R_j + D_k + C_l + S_o + (MR)_{ij} + (MD)_{ik} + (MC)_{il} + (RD)_{jk} + (RC)_{jl} + (DC)_{kl} + b1(X_1-\bar{X}_1) + b2(X_2-\bar{X}_2) + b3(X_3-\bar{X}_3)$$

where

b = the overall mean

M_i = the effect of the i^{th} task meaningfulness group

R_j = the effect of the j^{th} recitation type group

D_k = the effect of the k^{th} amount of material group

C_l = the effect of the l^{th} practice distribution group

S_o = the effect of the o^{th} sex group

$(MR)_{ij}$ = the interaction effect of the i^{th} task meaningfulness group with the j^{th} recitation type group

$(MD)_{ik}$ = the interaction effect of the i^{th} task meaningfulness group with the k^{th} amount of material group

$(MC)_{il}$ = the interaction effect of the i^{th} task meaningfulness group with the l^{th} practice distribution group

$(RD)_{jk}$ = the interaction effect of the j^{th} recitation type group with the k^{th} amount of material group

$(RC)_{jl}$ = the interaction effect of the j^{th} recitation type group with the l^{th} practice distribution group

$(DC)_{kl}$ = the interaction effect of the k^{th} amount of material group with the l^{th} practice distribution group

$b1$ = the partial regression of IQ on Y

$b2$ = the partial regression of MA on Y

$b3$ = the partial regression of CA on Y

e_{ijklo} = the random error

using subjects who had characteristics as nearly as possible similar to the subjects for whom they were being substituted. However, data reflecting the performance of these substitutes were not employed in the analyses of relationships among means for two reasons. First, statistical techniques were available for taking into account unequal subclass frequencies. Second, since IBM data processing procedures were being used, mechanical difficulties involved in manipulating individual cards during the several analyses were judged to outweigh the usefulness of adding subjects to maintain equal subclass frequencies. Accordingly, among the several analyses, small discrepancies occurred in the numbers of subjects employed. These discrepancies are reflected by differences among analyses in the degrees of freedom associated with the respective total and error sums of squares and mean squares; these differences are evident in the basic statistical tables.

In the various generalized analyses, data reflecting the performance of subjects using the several amount of material variants were employed in different ways. For subjects who used the pure parts and progressive parts methods, tests 1, 2, and 3 respectively encompassed the first, second, and third parts of the material; test 4 encompassed the total list consisting of the combination of these parts. For subjects who used the whole method, the four tests encompassed the total list. When the effects of the practice and task variables were being examined at the first three practice levels, scores of the subjects who used the whole method were divided: at any one test, scores used in the analysis reflected their performance related only to that portion of the total list on which subjects who used the two parts methods had been tested. At the last practice level, scores obtained by all groups on the total list were evaluated. When the effect of the levels variable was being evaluated, data used at the four practice levels were only the scores on the total list made by subjects using the whole method. Scores of subjects using the parts methods were not used in these analyses.

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CHAPTER III

RESULTS

The focus in this chapter is on obtained statistical information germane to the effects and interaction effects of the practice, subject, and task variables on learning performance at the four practice levels. This information is subsumed under two sections which respectively are entitled presentation of primary statistical data and summary of observed relationships. These sections appear immediately below.

Presentation of Primary Statistical Data

The detailed primary statistical data are presented in tabular form in Appendix D. These tables are labeled source tables. The contents of these source tables are not reiterated or described explicitly in the text within the body of the report. Rather, in the second section of this chapter, extant relationships are reorganized and summarized in terms of the specific research objectives listed in Chapter I. The reader interested in the more technical and abstract statistical information may examine or read the tables directly for himself. For the general reader, the contents of the second section of this chapter will furnish information about relationships apparent in the data while the contents of the source tables will remain a reference to be consulted about specific points.

Several comments about mechanics of presentation are pertinent here. First, the source tables in Appendix D are presented in the sequence in which the analyses were made. That is, the data include means, results of analyses of variance or analyses of covariance, and, when indicated, results of multiple range tests all germane to the following: relationships among scores of subjects in the major levels groups--practice and task variables held constant; relationships among scores of subjects who received the several practice and task variants--levels variable held constant; and relationships among scores of subjects within each major levels group who received the several practice and task variants. Second, the numbers in the tables were rounded by conventional procedures; the statistical analyses involved unrounded numbers. Third, symbols are employed extensively in the tables: Labels corresponding to the alphanumeric designations are those presented in the plan for analyses of results in Chapter II; labels for the statistics are those suggested and employed in standard statistics textbooks. Fourth, only prime statistical data are tabulated. The interested reader may compute figures not presented; *e.g.*, an F-ratio may be obtained by dividing the mean square for a main effect by the appropriate mean square error, sums of squares may be computed by multiplying the relevant mean squares by the associated degrees of freedom, *etc*. Fifth, with the exception of means computed in analyses of the relationships among the scores of the major levels groups--practice and task variables held constant, the several means are adjusted means computed within the conventional analysis of covariance framework. Also, all means are based on transformed scores. Therefore, all means reflect trends and relative performance rather than specific scores attained by the groups of subjects.

The locations of the source tables which contain data yielded by the several analyses are specified below.

1. Relationships among the scores of subjects in the major levels groups--practice and task variables held constant.

    a. Means, Source Table 1.
    b. Analysis of variance results, Source Table 2.
    c. Multiple range test results, Source Table 3.

2. Relationships among the scores of subjects who received the several practice and task variants--levels variable held constant.

    a. Means, Source Table 4.
    b. Analysis of covariance results, Source Table 5.
    c. Multiple range test results, Source Table 6.

3. Relationships among the scores of subjects within each major levels group who received the several practice and task variants.

    a. Within the B1 group.

        1) Means, Source Table 7.
        2) Analysis of covariance results, Source Table 8.
        3) Multiple range test results, Source Table 9.

b. Within the B2 group.

    1) Means, Source Table 10.
    2) Analysis of covariance results, Source Table 11.
    3) Multiple range test results, Source Table 12.

c. Within the B3 group.

    1) Means, Source Table 13.
    2) Analysis of covariance results, Source Table 14.
    3) Multiple range test results, Source Table 15.

d. Within the B4 group.

    1) Means, Source Table 16.
    2) Analysis of covariance results, Source Table 17.
    3) Multiple range test results, Source Table 18.

e. Within the B5 group.

    1) Means, Source Table 19.
    2) Analysis of covariance results, Source Table 20.
    3) Multiple range test results, Source Table 21.

f. Within the B6 group.

    1) Means, Source Table 22.
    2) Analysis of covariance results, Source Table 23.
    3) Multiple range test results, Table 24.

Summary of Observed Relationships

Cited in this section are relationships implicit in the primary data resulting from the several statistical analyses presented in the detailed source tables in Appendix D. These relationships are organized in terms of the specific research objectives listed in Chapter I as following from the purpose of the investigation.

To do this, the evidence germane to each variable or factor is classified in terms of the objective to which that variable pertains. Before the evidence is presented, the organizational system is outlined in order to facilitate the clarity and ease with which the transition involved here may be followed. Briefly, the outline involves recapitulating for each objective the alphanumeric labels used in Chapter II and the source tables in Appendix D to designate the several variables. This outline is cited immediately below.

1. Effects of the practice variables on learning performance.
   - a. Recitation type: R, R1 through R4.
   - b. Amount of material: D, D1 through D3.
   - c. Practice distribution: C, C1 and C2.
2. Effect of the task variable on learning performance.
   - a. Task meaningfulness: M, M1 and M2.
3. Effects of the subject variables on learning performance.
   - a. Levels: B, B1 through B6.
   - b. Sex: S, S1 and S2.
4. Interaction effects of the practice variables on learning performance.
   - a. Recitation type X amount of material: RD, R1D1 through R4D3.
   - b. Recitation type X practice distribution: RC, R1C1 through R4C2.
   - c. Amount of material X practice distribution: DC, D1C1 through D3C2.
5. Interaction effect of the subject variables on learning performance.
   - a. Levels X sex: BS or S within B, B1S1 through B6S2.
6. Interaction effects of the practice and task variables on learning performance.
   - a. Recitation type X task meaningfulness: MR, M1R1 through M2R4.
   - b. Amount of material X task meaningfulness: MD, M1D1 through M2D3.
   - c. Practice distribution X task meaningfulness: MC, M1C1 through M2C2.
7. Interaction effects of the practice and subject variables on learning performance.
   - a. Recitation type X levels: R within B, B1R1 through B6R4.
   - b. Amount of material X levels: D within B, B1D1 through B6D3.
   - c. Practice distribution X levels: C within B, B1C1 through B6C2.
   - d. Recitation type X amount of material X levels: RD within B, B1R1D1 through B6R4D3.
   - e. Recitation type X practice distribution X levels: RC within B, B1R1C1 through B6R4C2.

   f. Amount of material X practice distribution X levels: DC within B, B1D1C1 through B6D3C2.

8. Interaction effect of the task and subject variables on learning performance.

   a. Task meaningfulness X levels: M within B, B1M1 through B6M2.

9. Interaction effects of the practice, task, and subject variables on learning performance.

   a. Recitation type X task meaningfulness X levels: MR within B, B1R1M1 through B6R4M2.
   b. Amount of material X task meaningfulness X levels: MD within B, B1D1M1 through B6D3M2.
   c. Practice distribution X task meaningfulness X levels: MC within B, B1M1C1 through B6M2C2.

Effects of the Practice Variables on Learning Performance

The relationships emanating from the primary statistical data are presented below. As stated previously, these data are organized according to the several research objectives; they are cited in terms of the alphanumeric labels outlined immediately above.

Recitation Type

The recitation type variable did affect learning performance. Table 10 contains relevant data. All F-ratios occurred at probability levels less than .01. Paired comparisons revealed the following specific differences.

1. Reading--no recitation (R1) and reading--verbal recitation (R2). At practice levels 2, 3, and 4, the group using R1 had lower means than the group using R2.

2. Reading--no recitation (R1) and reading--written recitation (R3). At all practice levels, the group using R1 had lower means than the group using R3.

3. Reading--no recitation (R1) and reading--verbal and written recitation (R4). At all practice levels, the group using R1 had lower means than the group using R4.

4. Reading--verbal recitation (R2) and reading--written recitation (R3). At practice levels 1, 2, and 4, the group using R2 had lower means than the group using R3.

5. Reading--verbal recitation (R2) and reading--verbal and written recitation (R4). At all practice levels, the group using R2 had lower means than the group using R4.
6. Reading--written recitation (R3) and reading--verbal and written recitation (R4). At practice levels 1, 3, and 4, the group using R3 had lower means than the group using R4.

Table 10

Effect of Recitation Type (R) on Learning Performance

1. Probabilities of F-ratios Yielded by the Analyses of Covariance.

Analysis	Source Table #		Practice Level			
	ACV	MR	A1	A2	A3	A4
Variants--Levels Constant	5	6	$<.001^{a}$	$<.001^{b}$	$<.001^{c}$	$<.001^{d}$

2. Directions of Relationships Revealed by the Multiple Range Tests.

Practice Level	Paired Comparison					
	R1:R2	R1:R3	R1:R4	R2:R3	R2:R4	R3:R4
a) A1	R1=R2	R1<R3	R1<R4	R2<R3	R2<R4	R3<R4
b) A2	R1<R2	R1<R3	R1<R4	R2<R3	R2<R4	R3=R4
c) A3	R1<R2	R1<R3	R1<R4	R2=R3	R2<R4	R3<R4
d) A4	R1<R2	R1<R3	R1<R4	R2<R3	R2<R4	R3<R4

Amount of Material

The amount of material variable did affect learning performance. Listed in Table 11 are supporting data. All F-ratios occurred at probability levels less than .01. Paired comparisons revealed the following specific differences.

1. Whole (D1) method and pure parts (D2) method. At practice levels 1, 2, and 3, the group using D1 had lower means than the group using D2; the reverse was the case at practice level 4.

2. Whole (D1) method and progressive parts (D3) method. At practice levels 1 and 2, the group using D1 had lower means than the group using D3; the reverse was the case at practice levels 3 and 4.
3. Pure parts (D2) method and progressive parts (D3) method. At practice level 3, the group using D2 had a higher mean than the group using D3; at the remaining practice levels the groups had equivalent means.

Table 11

Effect of Amount of Material (D) on Learning Performance

1. Probabilities of F-ratios Yielded by the Analyses of Covariance.

Analysis	Source Table #		Practice Level			
	ACV	MR	A1	A2	A3	A4
Variants--Levels Constant	5	6	<.001[a]	<.001[b]	<.001[c]	<.001[d]

2. Directions of Relationships Revealed by the Multiple Range Tests.

Practice Level	Paired Comparison D1:D2	D1:D3	D2:D3
a) A1	D1<D2	D1<D3	D2=D3
b) A2	D1<D2	D1<D3	D2=D3
c) A3	D1<D2	D1>D3	D2>D3
d) A4	D1>D2	D1>D3	D2=D3

Practice Distribution

The practice distribution variable did not affect learning performance. The data in Table 12 indicate that no F-ratio occurred at a probability level less than .01.

Table 12

Effect of Practice Distribution (C) on Learning Performance

1. Probabilities of F-ratios Yielded by the Analyses of Covariance.

Analysis	Source Table #		Practice Level			
	ACV	MR	A1	A2	A3	A4
Variants-- Levels Constant	5	--	>.01	>.01	>.01	>.01

Effect of the Task Variable on Learning Performance

The task meaningfulness variable did not affect learning performance. Table 13 contains pertinent data. All F-ratios occurred at probability levels greater than .01.

Table 13

Effect of Task Meaningfulness (M) on Learning Performance

1. Probabilities of F-ratios Yielded by the Analyses of Covariance.

Analysis	Source Table #		Practice Level			
	ACV	MR	A1	A2	A3	A4
Variants-- Levels Constant	5	--	>.01	>.01	>.01	>.01

Effects of the Subject Variables on Learning Performance

Levels

Mental age did affect learning performance; CA and IQ did not. Relevant evidence appears in Table 14. All F-ratios occurred at probability levels less than .01. Paired comparisons revealed the following specific relationships.

1. Mental age equivalent, chronological age and intelligence quotient non-equivalent.

   a. Retarded (B1) and younger normal (B2) groups. At all practice levels, the B1 and B2 groups had equivalent means.

   b. Retarded (B1) and youngest superior (B3) groups. At all practice levels, the B1 and B3 groups had equivalent means.

   c. Normal (B2) and youngest superior (B3) groups. At all practice levels, the B2 and B3 groups had equivalent means.

Table 14

Effect of Levels (B) on Learning Performance

1. Probabilities of F-ratios Yielded by the Analyses of Variance.

Analysis	Source Table #		Practice Level			
	ACV	MR	A1	A2	A3	A4
Levels--Variants Constant	2	3	<.001	<.001	<.001	<.001

2. Directions of Relationships Revealed by the Multiple Range Tests.

* Paired Comparison	Practice Level			
	A1	A2	A3	A4
B1:B2	B1=B2	B1=B2	B1=B2	B1=B2
B1:B3	B1=B3	B1=B3	B1=B3	B1=B3
B1:B4	B1<B4	B1<B4	B1<B4	B1<B4
B1:B5	B1<B5	B1<B5	B1<B5	B1<B5
B1:B6	B1<B6	B1<B6	B1<B6	B1<B6
B2:B3	B2=B3	B2=B3	B2=B3	B2=B3
B2:B4	B2<B4	B2<B4	B2<B4	B2<B4
B2:B5	B2<B5	B2<B5	B2<B5	B2<B5
B2:B6	B2<B6	B2<B6	B2<B6	B2<B6
B3:B4	B3<B4	B3<B4	B3<B4	B3<B4
B3:B5	B3<B5	B3<B5	B3<B5	B3<B5
B3:B6	B3<B6	B3<B6	B3<B6	B3<B6

Table 14--(continued)

2. Directions of Relationships Revealed by the Multiple Range Tests.

Paired Comparison	Practice Level A1	A2	A3	A4
B4:B5	B4=B5	B4=B5	B4=B5	B4<B5
B4:B6	B4<B6	B4<B6	B4<B6	B4<B6
B5:B6	B5<B6	B5<B6	B5<B6	B5<B6

2. Chronological age equivalent, mental age and intelligence quotient non-equivalent.

    a. Retarded (B1) and older normal (B5) groups. At all practice levels, the B1 group had lower means than the B5 group.

    b. Retarded (B1) and oldest superior (B6) groups. At all practice levels, the B1 group had lower means than the B6 group.

    c. Younger normal (B2) and intermediate superior (B4) groups. At all practice levels, the B2 group had lower means than the B4 group.

    d. Older normal (B5) and oldest superior (B6) groups. At all practice levels, the B5 group had lower means than the B6 group.

3. Intelligence quotient equivalent, chronological age and mental age non-equivalent.

    a. Younger normal (B2) and older normal (B5) groups. At all practice levels, the B2 group had lower means than the B5 group.

    b. Youngest superior (B3) and intermediate superior (B4) groups. At all practice levels, the B3 group had lower means than the B4 group.

    c. Youngest superior (B3) and oldest superior (B6) groups. At all practice levels, the B3 group had lower means than the B6 group.

    d. Intermediate superior (B4) and oldest superior (B6) groups. At all practice levels, the B4 group had lower means than the B6 group.

Sex

The sex variable did not affect learning performance. Table 15 includes pertinent statistics. The F-ratios associated with the sex variable all occurred at probability levels greater than .01

Table 15

Effect of Sex (S) on Learning Performance

1. Probabilities of F-ratios Yielded by the Analyses of Covariance.

Analysis	Source Table #		Practice Level			
	ACV	MR	A1	A2	A3	A4
Variants-- Levels Constant	5	--	>.01	>.01	>.01	>.01

Interaction Effects of the Practice Variables on Learning Performance

Recitation Type X Amount of Material

The recitation type and amount of material variables did not interact to affect learning performance. Data in Table 15 are germane. The F-ratio at practice level 1 was significant. The F-ratios at the remaining practice levels occurred at probability levels greater than .01. Paired comparisons revealed the following specific differences.

1. Whole (D1), pure parts (D2), and progressive parts (D3) methods in combination with reading--no recitation (R1), and reading--verbal and written recitation (R4). The group using R1D1 had a higher mean than the group using R4D1; the group using R1D2 had a lower mean than the group using R4D2.

2. Whole (D1), pure parts (D2), and progressive parts (D3) methods in combination with reading--verbal recitation (R2) and reading--verbal and written recitation (R4). The group using R2D1 had a higher mean than the group using R4D1.

3. Whole (D1), pure parts (D2), and progressive parts (D3) methods in combination with reading--written recitation (R3) and reading--writter recitation (R3) and reading--verbal and written recitation (R4). The group using R3D1 had a higher mean than the group using R4D1.

Table 16

Interaction Effect of Recitation Type and Amount of Material (RD) on Learning Performance

1. Probabilities of F-ratios Yielded by the Analyses of Covariance.

Analysis	Source Table #		Practice Level			
	ACV	MR	A1	A2	A3	A4
Variants--Levels Constant	5	6	<.001[a]	>.01	>.01	>.01

2. Directions of Relationships Revealed by the Multiple Range Tests.

Practice Level	D	Paired Comparison					
		R1:R2	R1:R3	R1:R4	R2:R3	R2:R4	R3:R4
a) A1	D1	R1=R2	R1=R3	R1>R4	R2=R3	R2>R4	R3>R4
	D2	R1=R2	R1=R3	R1<R4	R2=R3	R2=R4	R3=R4
	D3	R1=R2	R1=R3	R1=R4	R2=R3	R2=R4	R3=R4

Recitation Type X Practice Distribution

The recitation type and practice distribution variables did not interact to affect learning performance. Inspection of Table 17 reveals that no F-ratio occurred at a probability less than .01.

Table 17

Interaction Effect of Recitation Type and Practice Distribution (RC) on Learning Performance

1. Probabilities of F-ratios Yielded by the Analyses of Covariance.

Analysis	Source Table #		Practice Level			
	ACV	MR	A1	A2	A3	A4
Variants--Levels Constant	5	--	>.01	>.01	>.01	>.01

Amount of Material X Practice Distribution

The amount of material and practice distribution variables did not interact to affect learning performance. All F-ratios occurred at probability levels greater than .01 (Table 18).

Table 18

Interaction Effect of Amount of Material and Practice Distribution (DC) on Learning Performance

1. Probabilities of F-ratios Yielded by the Analyses of Covariance.

Analysis	Source Table # ACV	Source Table # MR	Practice Level A1	Practice Level A2	Practice Level A3	Practice Level A4
Variants-- Levels Constant	5	--	>.01	>.01	>.01	>.01

Interaction Effect of the Subject Variables on Learning Performance

Generally, the levels and sex variables did not interact to affect learning performance. The information in Table 19 reveals that in only four of the 24 comparisons did the F-ratios occur at probability levels less than .01. Comparisons revealed the following specific differences.

1. Within the retarded (B1) group: males (S1) and females (S2). At practice levels 3 and 4, the S1 group had higher means than the S2 group.

2. Within the intermediate superior (B4) group: males (S1) and females (S2). At practice levels 3 and 4, the S1 group had higher means than the S2 group.

Table 19

Interaction Effect of Levels and Sex (S within B) on Learning Performance

1. Probabilities of F-ratios Yielded by the Analyses of Covariance.

Analysis	Source Table #		Practice Level			
	ACV	MR	A1	A2	A3	A4
Within B1[a]	8	9	>.01	>.01	<.01	<.01
Within B2	11	--	>.01	>.01	>.01	>.01
Within B3	14	--	>.01	>.01	>.01	>.01
Within B4[b]	17	18	>.01	>.01	<.01	<.001
Within B5	20	--	>.01	>.01	>.01	>.01
Within B6	23	--	>.01	>.01	>.01	>.01

2. Directions of Relationships Revealed by the Multiple Range Tests.

Analysis	Practice Level	Paired Comparison S1:S2
a) W/B1	A3	S1>S2
	A4	S1>S2
b) W/B4	A3	S1>S2
	A4	S1>S2

The Interaction Effect of the Practice and Task Variables on Learning Performance

Recitation Type X Task Meaningfulness

Recitation type and task meaningfulness did not interact to affect learning performance. Differences occurred, but they were not consistently heterogeneous. Data are in Table 20. At practice levels 1, 3, and 4, the F-ratios occurred at probability levels less than .01. Paired comparisons revealed the following specific differences.

1. Logical (M1) and non-logical (M2) material in combination with reading--no recitation (R1) and reading--verbal and written recitation (R4). At practice levels 1,3, and 4, the group using M1R1 had lower means than the group using M1R4; the group using M2R1 had higher means than the group using M2R4.

2. Logical (M1) and non-logical (M2) material in combination with reading--verbal recitation (R2) and reading--written recitation (R3). At practice level 1, the group using M1R2 had a higher mean than the group using M1R3; the reverse was the case at practice level 3. Also at practice level 3, the group using M2R2 had a higher mean than the group using M2R3.

Table 20

Interaction Effect of Recitation Type and Task Meaningfulness (MR) on Learning Performance

1. Probabilities of F-ratios Yielded by the Analyses of Covariance.

Analysis	Source Table #		Practice Level			
	ACV	MR	A1	A2	A3	A4
Variants--Levels Constant	5	6	$<.001^a$	$>.01$	$<.001^b$	$<.001^c$

2. Directions of Relationships Revealed by the Multiple Range Tests.

Practice Level	M	Paired Comparisons					
		R1:R2	R1:R3	R1:R4	R2:R3	R2:R4	R3:R4
a) A1	M1	R1=R2	R1=R3	R1<R4	R2>R3	R2<R4	R3<R4
	M2	R1=R2	R1=R3	R1>R4	R2=R3	R2>R4	R3>R4
b) A3	M1	R1=R2	R1=R3	R1<R4	R2<R3	R2<R4	R3<R4
	M2	R1=R2	R1=R3	R1>R4	R2>R3	R2>R4	R3>R4
c) A4	M1	R1=R2	R1=R3	R1<R4	R2=R3	R2<R4	R3<R4
	M2	R1=R2	R1=R3	R1>R4	R2=R3	R2>R4	R3>R4

3. Logical (M1) and non-logical (M2) material in combination with reading--verbal recitation (R2) and reading--verbal and written recitation (R4). At practice levels 1, 3, and 4, the group using M1R2 had lower means than the group using M1R4; the group using M2R2 had higher means than the group using M2R4.

4. Logical (M1) and non-logical (M2) material in combination with reading--written recitation (R3) and reading--verbal and written recitation (R4). At practice levels 1,3, and 4, the group using M1R3 had lower means than the group using M1R4; the group using M2R3 had higher means than the group using M2R4.

Amount of Material X Task Meaningfulness

The amount of material and task meaningfulness variables did not interact to affect learning performance. The data in Table 21 reveal that in no comparison did an F-ratio occur at a probability level smaller than .01.

Table 21

Interaction Effect of Amount of Material and Task Meaningfulness (MD) on Learning Performance

1. Probabilities of F-ratios Yielded by the Analyses of Covariance.

Analysis	Source Table # ACV	MR	Practice Level A1	A2	A3	A4
Variants--Levels Constant	5	--	>.01	>.01	>.01	>.01

Practice Distribution X Task Meaningfulness

The practice distribution and task meaningfulness variables did not interact to affect learning performance. Table 22 contains relevant data. No F-ratio occurred at a probabilitiy level less than .01.

Table 22

Interaction Effect of Practice Distribution and Task Meaningfulness (MC) on Learning Performance

1. Probabilities of F-ratios Yielded by the Analyses of Covariance.

Analysis	Source Table # ACV	MR	Practice Level A1	A2	A3	A4
Variants--Levels Constant	5	--	>.01	>.01	>.01	>.01

Interaction Effects of the Practice and Subject Variables on Learning Performance

Recitation Type X Levels

The recitation type and levels variables did not interact to affect learning performance. Differences occurred; however, these differences were in the same direction within the several groups. Pertinent data are in Table 23. In 18 of the 24 comparisons, the F-ratios occurred at probability levels less than .01. Paired comparisons revealed the following specific differences.

1. Within the retarded (B1) group: reading--no recitation (R1), reading--verbal recitation (R2), reading--written recitation (R3), and reading--verbal and written recitation (R4).
    - a. At practice level 4, the group using R1 had a lower mean than the group using R2.
    - b. At practice level 4, the group using R1 had a lower mean than the group using R3.
    - c. At practice levels 3 and 4, the group using R1 had lower means than the group using R4.
    - d. At practice levels 3 and 4, the group using R2 had lower means than the group using R4.

Table 23

Interaction Effect of Recitation Type and Levels (R Within B) on Learning Performance

1. Probabilities of F-ratios Yielded by the Analyses of Covariance.

Analysis	Source Table # ACV	Source Table # MR	Practice Level A1	Practice Level A2	Practice Level A3	Practice Level A4
Within B1[a]	8	9	>.01	>.01	<.001	<.001
Within B2[b]	11	12	<.001	<.001	<.001	<.001
Within B3[c]	14	15	>.01	>.01	<.001	<.001
Within B4[d]	17	18	<.001	<.001	<.001	<.001
Within B5[e]	20	21	>.01	<.001	<.001	<.001
Within B6[f]	23	24	<.001	<.001	<.001	<.001

Table 23--(continued)

2. Directions of Relationships Revealed by the Multiple Range Tests.

Analysis	Practice Level	Paired Comparison R1:R2	R1:R3	R1:R4	R2:R3	R2:R4	R[illegible]
a) W/B1	A3	R1=R2	R1=R3	R1<R4	R2=R3	R2<R4	R3<R4
	A4	R1<R2	R1<R3	R1<R4	R2=R3	R2<R4	R3=R4
b) W/B2	A1	R1=R2	R1=R3	R1=R4	R2<R3	R2<R4	R3=R4
	A2	R1=R2	R1<R3	R1<R4	R2=R3	R2<R4	R3=R4
	A3	R1=R2	R1=R3	R1<R4	R2=R3	R2<R4	R3<R4
	A4	R1=R2	R1=R3	R1<R4	R2=R3	R2<R4	R3<R4
c) W/B3	A3	R1<R2	R1=R3	R1<R4	R2=R3	R2<R4	R3<R4
	A4	R1=R2	R1=R3	R1<R4	R2=R3	R2<R4	R3<R4
d) W/B4	A1	R1=R2	R1=R3	R1<R4	R2<R3	R2<R4	R3=R4
	A2	R1=R2	R1<R3	R1<R4	R2<R3	R2<R4	R3=R4
	A3	R1<R2	R1<R3	R1<R4	R2=R3	R2<R4	R3<R4
	A4	R1=R2	R1<R3	R1<R4	R2<R3	R2<R4	R3=R4
e) W/B5	A2	R1=R2	R1<R3	R1<R4	R2=R3	R2=R4	R3=R4
	A3	R1<R2	R1=R3	R1<R4	R2=R3	R2=R4	R3<R4
	A4	R1<R2	R1<R3	R1<R4	R2=R3	R2<R4	R3=R4
f) W/B6	A1	R1=R2	R1=R3	R1<R4	R2=R3	R2<R4	R3<R4
	A2	R1=R2	R1<R3	R1<R4	R2=R3	R2=R4	R3=R4
	A3	R1=R2	R1=R3	R1<R4	R2=R3	R2<R4	R3<R4
	A4	R1<R2	R1<R3	R1<R4	R2=R3	R2<R4	R3=R4

e. At practice level 3, the group using R3 had a lower mean than the group using R4.

2. Within the younger normal (B2) group: reading--no recitation (R1), reading--verbal recitation (R2), reading--written recitation (R3), and reading--verbal and written recitation (R4).

    a. At practice level 2, the group using R1 had a lower mean than the group using R3.

    b. At practice levels 2, 3, and 4, the group using R1 had lower means than the group using R4.

c. At practice level 1, the group using R2 had a lower mean than the group using R3.

d. At all practice levels, the group using R2 had lower means than the group using R4.

e. At practice levels 3 and 4, the group using R3 had lower means than the group using R4.

3. Within the youngest superior (B3) group: reading--no recitation (R1), reading--verbal recitation (R2), reading--written recitation (R3), and reading--verbal and written recitation (R4).

   a. At practice level 3, the group using R1 had a lower mean than the group using R2.

   b. At practice levels 3 and 4, the group using R1 had lower means than the group using R4.

   c. At practice levels 3 and 4, the group using R2 had lower means than the group using R4.

   d. At practice levels 3 and 4, the group using R3 had lower means than the group using R4.

4. Within the intermediate superior (B4) group: reading--no recitation (R1), reading--verbal recitation (R2), reading--written recitation (R3), and reading--verbal and written recitation (R4).

   a. At practice level 3, the group using R1 had a lower mean than the group using R2.

   b. At practice levels 2, 3, and 4, the group using R1 had lower means than the group using R3.

   c. At all practice levels, the group using R1 had lower means than the group using R4.

   d. At practice levels 1, 2, and 4, the group using R2 had lower means than the group using R3.

   e. At all practice levels, the group using R2 had lower means than the group using R4.

   f. At practice level 3, the group using R3 had a lower mean than the group using R4.

5. Within the older normal (B5) group: reading--no recitation (R1), reading--verbal recitation (R2), reading--written recitation (R3), reading--verbal and written recitation (R4).

a. At practice levels 3 and 4, the group using R1 had lower means than the group using R2.

b. At practice levels 2 and 4, the group using R1 had lower means than the group using R3.

c. At practice levels 2, 3, and 4, the group using R1 had lower means than the group using R4.

d. At practice level 4, the group using R2 had a lower mean than the group using R4.

e. At practice level 3, the group using R3 had a lower mean than the group using R4.

6. Within the oldest superior (B6) group: reading--no recitation (R1), reading--verbal recitation (R2), reading--written recitation (R3), and reading--verbal and written recitation (R4).

a. At practice level 4, the group using R1 had a lower mean than the group using R2.

b. At practice levels 2 and 4, the group using R1 had lower means than the group using R3.

c. At all practice levels, the group using R1 had lower means than the group using R4.

d. At practice levels 1, 3, and 4, the group using R2 had lower means than the groups using R4.

e. At practice levels 1 and 3, the group using R3 had lower means than the group using R4.

Amount of Material X Levels

The amount of material and levels variables did not interact to affect performance. Differences occurred; however, these differences were in the same direction within the several groups. That is, the several levels groups generally responded similarly to the whole, pure parts, and progressive parts methods. Table 24 includes relevant data. In 21 out of the 24 comparisons, the F-ratios occurred at probability levels less than .01. Paired comparisons revealed the following specific differences.

1. Within the retarded (B1) group: whole (D1), pure parts (D2), and progressive parts (D3) methods.

   a. At practice levels 1 and 2, the group using D1 had a lower mean than the group using D2; the reverse was the case at practice level 4.

   b. At practice levels 1 and 2, the group using D1 had a lower mean than the group using D3; the reverse was the case at practice level 4.

2. Within the younger normal (B2) group: whole (D1), pure parts (D2), and progressive parts (D3) methods.

   a. At practice levels 1 and 2, the group using D1 had lower means than the group using D2; the reverse was the case at practice level 4.

   b. At practice levels 1 and 2, the group using D1 had lower means than the group using D3; the reverse was the case at practice level 4.

Table 24

Interaction Effect of Amount of Material and Levels (D within B) on Learning Performance

1. Probabilities of F-ratios Yielded by the Analyses of Covariance.

Analysis	Source Table #		Practice Level			
	ACV	MR	A1	A2	A3	A4
Within B1[a]	8	9	<.001	<.001	>.01	<.001
Within B2[b]	11	12	<.001	<.001	>.01	<.001
Within B3[c]	14	15	<.001	<.001	>.01	<.001
Within B4[d]	17	18	<.001	<.001	<.01	<.001
Within B5[e]	20	21	<.001	<.001	<.001	<.001
Within B6[f]	23	24	<.001	<.001	<.001	<.001

2. Directions of Relationships Revealed by the Multiple Range Tests.

Table 24--(Continued)

Analysis	Practice Level	Paired Comparison D1:D2	D1:D3	D2:D3
a) W/B1	A1	D1<D2	D1<D3	D2=D3
	A2	D1<D2	D1<D3	D2=D3
	A4	D1>D2	D1>D3	D2=D3
b) W/B2	A1	D1<D2	D1<D3	D2=D3
	A2	D1<D2	D1<D3	D2=D3
	A4	D1>D2	D1>D3	D2=D3
c) W/B3	A1	D1<D2	D1<D3	D2=D3
	A2	D1<D2	D1<D3	D2=D3
	A4	D1>D2	D1>D3	D2=D3
d) W/B4	A1	D1<D2	D1<D3	D2=D3
	A2	D1<D2	D1<D3	D2=D3
	A3	D1<D2	D1>D3	D2>D3
	A4	D1>D2	D1>D3	D2=D3
e) W/B5	A1	D1<D2	D1<D3	D2=D3
	A2	D1<D2	D1<D3	D2=D3
	A3	D1<D2	D1=D3	D2>D3
	A4	D1>D2	D1>D3	D2=D3
f) W/B6	A1	D1<D2	D1<D3	D2=D3
	A2	D1<D2	D1<D3	D2=D3
	A3	D1=D2	D1>D3	D2>D3
	A4	D1>D2	D1>D3	D2=D3

3. Within the youngest superior (B3) group: whole (D1), pure parts (D2), and progressive parts (D3) methods.

   a. At practice levels 1 and 2, the group using D1 had lower means than the group using D2; the reverse was the case at practice level 4.

   b. At practice levels 1 and 2, the group using D1 had lower means than the group using D3; the reverse was the case at practice level 4.

4. Within the intermediate superior (B4) group: whole (D1), pure parts (D2), and progressive parts (D3) methods.

   a. At practice levels 1, 2, and 3, the group using D1 had lower means than the group using D2; the reverse was the case at practice level 4.

   b. At practice levels 1 and 2, the group using D1 had lower means than the group using D3; the reverse was the case at practice levels 3 and 4.

   c. At practice level 3, the group using D2 had a higher mean than the group using D3.

5. Within the older normal (B5) group: whole (D1), pure parts (D2), and progressive parts (D3) methods.

   a. At practice levels 1, 2, and 3, the group using D1 had lower means than the group using D2; the reverse was the case at practice level 4.

   b. At practice levels 1 and 2, the group using D1 had lower means than the group using D3; the reverse was the case at practice level 4.

   c. At practice level 3, the group using D2 had a higher mean than the group using D3.

6. Within the oldest superior (B6) group: whole (D1), pure parts (D2), and progressive parts (D3) methods.

   a. At practice levels 1 and 2, the group using D1 had lower means than the group using D2; the reverse was the case at practice level 4.

   b. At practice levels 1 and 2, the group using D1 had lower means than the group using D3; the reverse was the case at practice levels 3 and 4.

   c. At practice level 3, the group using D2 had a higher mean than the group using D3.

Practice Distribution X Levels

The practice distribution and levels variables did not interact to affect learning performance. With one exception, the F-ratios referred to in Table 24 occurred at probability levels greater than .01.

A paired comparison revealed the following specific difference.

1. Within the retarded (B1) group: massed (C1) and distributed (C2) practice. At practice level 4, the group using C1 had a lower mean than the group using C2.

Table 25

Interaction Effect of Practice Distribution and Levels (C within B) on Learning Performance

1. Probabilities of F-ratios Yielded by the Analyses of Covariance.

Analysis	Source Table #		Practice Level (A)			
	ACV	MR	A1	A2	A3	A4
Within B1[a]	8	9	>.01	>.01	>.01	<.01
Within B2	11	--	>.01	>.01	>.01	>.01
Within B3	14	--	>.01	>.01	>.01	>.01
Within B4	17	--	>.01	>.01	>.01	>.01
Within B5	20	--	>.01	>.01	>.01	>.01
Within B6	23	--	>.01	>.01	>.01	>.01

2. Directions of Relationships Revealed by the Multiple Range Tests.

Analysis	Practice Level	Paired Comparison C1:C2
a) W/B1	A4	C1<C2

Recitation Type X Amount of Material X Levels

On the whole, the recitation type, amount of material, and levels variables did not interact to affect learning performance. The data in Table 26 reveal that in only five of thirty comparisons did the F-ratios occur at probability levels less than .01. Paired comparisons revealed the following specific differences.

Table 26

Interaction Effect of Recitation Type, Amount of Material, and Levels (RD within B) on Learning Performance

1. Probabilities of F-ratios Yielded by the Analyses of Covariance.

Analysis	Source Table #		Practice Level (A)			
	ACV	MR	A1	A2	A3	A4
Within B1[a]	8	9	<.001	>.01	>.01	>.01
Within B2[b]	11	12	>.01	>.01	<.01	>.01
Within B3	14	--	>.01	>.01	>.01	>.01
Within B4[c]	17	18	<.01	>.01	>.01	>.01
Within B5	20	--	>.01	>.01	>.01	>.01
Within B6[d]	23	24	<.01	>.01	<.01	>.01

2. Directions of Relationships Revealed by the Multiple Range Tests.

Analysis	Practice Level	D	Paired Comparison R1:R2	R1:R3	R1:R4	R2:R3	R2:R4	R3:R4
a) W/B1	A1	D1	R1=R2	R1=R3	R1>R4	R2=R3	R2>R4	R3>R4
		D2	R1=R2	R1=R3	R1=R4	R2=R3	R2=R4	R3=R4
		D3	R1=R2	R1=R3	R1<R4	R2=R3	R2=R4	R3=R4
b) W/B2	A3	D1	R1=R2	R1=R3	R1<R4	R2=R3	R2=R4	R3=R4
		D2	R1=R2	R1=R3	R1=R4	R2=R3	R2=R4	R3=R4
		D3	R1=R2	R1=R3	R1=R4	R2=R3	R2=R4	R3=R4
c) W/B4	A1	D1	R1=R2	R1=R3	R1=R4	R2=R3	R2>R4	R3>R4
		D2	R1=R2	R1=R3	R1=R4	R2=R3	R2<R4	R3=R4
		D3	R1=R2	R1=R3	R1=R4	R2=R3	R2=R4	R3<R4
d) W/B6	A1	D1	R1>R2	R1=R3	R1=R4	R2=R3	R2=R4	R3=R4
		D2	R1<R2	R1=R3	R1=R4	R2=R3	R2=R4	R3=R4
		D3	R1=R2	R1=R3	R1=R4	R2=R3	R2=R4	R3>R4
	A3	D1	R1=R2	R1=R3	R1=R4	R2=R3	R2=R4	R3>R4
		D2	R1=R2	R1=R3	R1=R4	R2=R3	R2=R4	R3=R4
		D3	R1=R2	R1=R3	R1=R4	R2=R3	R2<R4	R3=R4

1. Within the retarded (B1) group: whole (D1), pure parts (D2), and progressive parts (D3) methods in combination with reading--no recitation (R1), reading--verbal recitation (R2), reading--written recitation (R3), and reading--verbal and written recitation (R4).

    a. At practice level 1, the group using R1D1 had a higher mean than the group using R4D1; the group using R1D3 had a lower mean than the group using R4D3.

    b. At practice level 1, the group using R2D1 had a higher mean than the group using R4D1.

    c. At practice level 1, the group using R3D1 had a higher mean than the group using R4D1.

2. Within the younger normal (B2) group: whole (D1), pure parts (D2), and progressive parts (D3) methods in combination with reading--no recitation (R1), reading--verbal recitation (R2), reading--written recitation (R3), and reading--verbal and written recitation (R4).

    a. At practice level 3, the group using R1D1 had a lower mean than the group using R4D1.

3. Within the intermediate superior (B4) group: whole (D1), pure parts (D2), and progressive parts (D3) methods in combination with reading--no recitation (R1), reading--verbal recitation (R2), reading--written recitation (R3), and reading--verbal and written recitation (R4).

    a. At practice level 1, the group using R2D1 had a higher mean than the group using R4D1; the group using R2D2 had a lower mean than the group using R4D2.

    b. At practice level 1, the group using R3D1 had a higher mean than the group using R4D1; the group using R3D3 had a lower mean than the group using R4D3.

4. Within the oldest superior (B6) group: whole (D1), pure parts (D2), and progressive parts (D3) methods in combination with reading--no recitation (R1), reading--verbal recitation (R2), reading--written recitation (R3), and reading--verbal and written recitation (R4).

    a. At practice level 1, the group using R1D1 had a higher mean than the group using R2D1; the group using R1D2 had a lower mean than the group using R2D2.

    b. At practice level 3, the group using R2D3 had a lower mean than the group using R4D3.

    c. At practice level 3, the group using R3D1 had a higher mean than the group using R4D1.

Recitation Type X Practice Distribution X Levels

The recitation type, practice distribution, and levels variables did not interact to affect learning performance. With one exception, the F-ratios encompassed in Table 27 occurred at probability levels greater than .01. Paired comparisons revealed the following specific differences.

1. Within the younger normal (B2) group: massed (C1) practice and distributed (C2) practice in combination with reading--no recitation (R1), reading--verbal recitation (R2), reading--written recitation (R3), and reading--verbal and written recitation (R4).
    a. At practice level 4, the group using R2C1 had a lower mean than the group using R4C1; the group using R2C2 had a higher mean than the group using R4C2.

Table 27

Interaction Effect of Recitation Type, Practice Distribution, and Levels (RC within B) on Learning Performance

1. Probabilities of F-ratios Yielded by the Analyses of Covariance.

Analysis	Source Table # ACV	MR	Practice Level (A) A1	A2	A3	A4
Within B1	8	--	>.01	>.01	>.01	>.01
Within B2[a]	11	12	>.01	>.01	>.01	<.01
Within B3	14	--	>.01	>.01	>.01	>.01
Within B4	17	--	>.01	>.01	>.01	>.01
Within B5	20	--	>.01	>.01	>.01	>.01
Within B6	23	--	>.01	>.01	>.01	>.01

2. Directions of Relationships Revealed by the Multiple Range Tests.

Analysis	Practice Level	C	Paired Comparison R1:R2	R1:R3	R1:R4	R2:R3	R2:R4	R3:R4
a) W/B2	A4	C1	R1=R2	R1=R3	R1=R4	R2=R3	R2<R4	R3=R4
		C2	R1=R2	R1=R3	R1=R4	R2=R3	R2>R4	R3=R4

Amount of Material X Practice Distribution X Levels

The amount of material, practice distribution, and levels variables did not interact to affect learning performance. Pertinent data are in Table 28. F-ratios which occurred at probability levels less than .01 were obtained in only three instances. Paired comparisons revealed the following specific differences.

1. Within the intermediate superior (B4) group: massed (C1) and distributed (C2) practice in combination with the whole (D1), pure parts (D2), and progressive parts (D3) methods.
    a. At practice level 1, the group using D1C1 had a lower mean than the group using D2C1; the group using D1C2 had a higher mean than the group using D2C2.

Table 28

Interaction Effect of Amount of Material, Practice Distribution, and Levels (DC within B) on Learning Performance

1. Probabilities of F-ratios Yielded by the Analyses of Covariance.

Analysis	Source Table # ACV	MR	Practice Level (A) A1	A2	A3	A4
Within B1	8	--	>.01	>.01	>.01	>.01
Within B2	11	--	>.01	>.01	>.01	>.01
Within B3[a]	14	15	<.01	>.01	>.01	>.01
Within B4[b]	17	18	<.01	>.01	>.01	>.01
Within B5	20	--	>.01	>.01	>.01	>.01
Within B6[c]	23	24	<.01	>.01	>.01	>.01

2. Directions of Relationships Revealed by the Multiple Range Tests.

Analysis	Practice Level	C	Paired Comparison D1:D2	D1:D3	D2:D3
a) W/B3	A1	C1	D1=D2	D1=D3	D2=D3
		C2	D1=D2	D1=D3	D2=D3
b) W/B4	A1	C1	D1<D2	D1=D3	D2=D3
		C2	D1>D2	D1=D3	D2=D3
c) W/B6	A1	C1	D1<D2	D1=D3	D2=D3
		C2	D1>D2	D1=D3	D2=D3

2. Within the oldest superior (B6) group: massed (C1) and distributed (C2) practice in combination with the whole (D1), pure parts (D2), and progressive parts (D3) methods.

    a. At practice level 1, the group using D1C1 had a lower mean than the group using D2C1; the group using D1C2 had a higher mean than the group using D2C2.

Interaction Effect of the Task and Subject Variables on Learning Performance

Task Meaningfulness X Levels

The task meaningfulness and levels variables did not interact to affect learning performance. The data in Table 29 indicate that with two exceptions the pertinent F-ratios occurred at probability levels greater than .01. Paired comparisons revealed the following specific differences.

Table 29

Interaction Effect of Extent of Task Meaningfulness and Levels (M within B) on Learning Performance

1. Probabilities of F-ratios Yielded by the Analyses of Covariance.

Analysis	Source Table #		Practice Level (A)			
	ACV	MR	A1	A2	A3	A4
Within B1[a]	8	9	<.01	>.01	>.01	>.01
Within B2	11	--	>.01	>.01	>.01	>.01
Within B3[b]	14	15	>.01	>.01	<.01	>.01
Within B4	17	--	>.01	>.01	>.01	>.01
Within B5	20	--	>.01	>.01	>.01	>.01
Within B6	23	--	>.01	>.01	>.01	>.01

2. Directions of Relationships Revealed by the Multiple Range Tests.

Analysis	Practice Level	Paired Comparison M1:M2
a) W/B1	A1	M1=M2
b) W/B3	A3	M1<M2

1. Withing the youngest superior (B3) group: logical (M1) and non-logical (M2) material.

    a. At practice level 3, the group using M1 had a lower mean than the group using M2.

Interaction Effect of the Practice, Task, and Subject Variables on Learning Performance

Recitation Type X Task Meaningfulness X Levels

The task meaningfulness, recitation type, and levels variables did not interact consistently to affect learning performance. Relevant data are in Table 30. In only six out of thirty comparisons did the F-ratios occur at probability levels less than .01. Paired comparisons revealed the following specific differences.

Table 30

Interaction Effect of Task Meaningfulness, Recitation Type, and Levels (MR within B) on Learning Performance

1. Probabilities of F-ratios Yielded by the Analyses of Covariance.

Analysis	Source Table # ACV	Source Table # MR	Practice Level A1	Practice Level A2	Practice Level A3	Practice Level A4
Within B1[a]	8	9	<.001	>.01	>.01	>.01
Within B2[b]	11	12	>.01	>.01	[illegible].01	>.01
Within B3	14	-	>.01	>.01	>.01	>.01
Within B4[c]	17	18	>.01	>.01	<.001	>.01
Within B5[d]	20	21	>.01	>.01	<.01	>.01
Within B6[e]	23	24	<.01	<.01	>.01	>.01

2. Directions of Relationships Revealed by the Multiple Range Tests.

Analysis	Practice Level	M	Paired Comparison R1:R2	R1:R3	R1:R4	R2:R3	R2:R4	R3:R4
a) W/B1	A1	M1	R1=R2	R1=R3	R1=R4	R2=R3	R2<R4	R3<R4
		M2	R1=R2	R1=R3	R1=R4	R2=R3	R2>R4	R3>R4

Table 30--(continued)

Analysis	Practice Level	M	Paired Comparison					
			R1:R2	R1:R3	R1:R4	R2:R3	R2:R4	R3:R4
b) W/B2	A3	M1	R1=R2	R1=R3	R1<R4	R2=R3	R2<R4	R3<R4
		M2	R1=R2	R1=R3	R1>R4	R2=R3	R2>R4	R3=R4
c) W/B4	A3	M1	R1=R2	R1=R3	R1<R4	R2<R3	R2<R4	R3=R4
		M2	R1=R2	R1=R3	R1>R4	R2>R3	R2>R4	R3=R4
d) W/B5	A3	M1	R1=R2	R1=R3	R1=R4	R2=R3	R2<R4	R3=R4
		M2	R1=R2	R1=R3	R1=R4	R2=R3	R2>R4	R3=R4
e) W/B6	A1	M1	R1=R2	R1<R3	R1=R4	R2=R3	R2=R4	R3=R4
		M2	R1=R2	R1>R3	R1=R4	R2=R3	R2=R4	R3=R4
	A2	M1	R1=R2	R1=R3	R1=R4	R2=R3	R2=R4	R3<R4
		M2	R1=R2	R1=R3	R1=R4	R2=R3	R2=R4	R3>R4

1. Within the retarded (B1) group: logical (M1) and non-logical (M2) material in combination with reading--no recitation (R1), reading--verbal recitation (R2), reading--written recitation (R3), and reading--verbal and written recitation (R4).

    a. At practice level1, the group using M1R2 had a lower mean than the group using M1R4; the group using M2R2 had a higher mean than the group using M2R4.

    b. At practice level 1, the group using M1R3 had a lower mean than the group using M1R4; the group using M2R3 had a higher mean than the group using M2R4.

2. Within the younger normal (B2) group: logical (M1) and non-logical (M2) material in combination with reading--no recitation (R1), reading--verbal recitation (R2), reading--written recitation (R3), and reading--verbal and written recitation (R4).

    a. At practice level 3, the group using M1R1 had a lower mean than the group using M1R4; the group using M2R1 had a higher mean than the group using M2R4.

    b. At practice level 3, the group using M1R2 had a lower mean than the group using M1R4; the group using M2R2 had a higher mean than the group using M2R4.

3. Within the intermediate superior (B4) group: logical (M1) and non-logical (M2) material in combination with reading--no recitation (R1), reading--verbal recitation (R2), reading--written recitation (R3), and reading--verbal and written recitation (R4).

    a. At practice level 3, the group using M1R1 had a lower mean than the group using M1R4; the group using M2R1 had a higher mean than the group using M2R4.

    b. At practice level 3, the group using M1R2 had a lower mean than the group using M1R3; the group using M2R2 had a higher mean than the group using M2R3.

c. At practice level 3, the group using M1R2 had a lower mean than the group using M1R4; the group using M2R2 had a higher mean than the group using M2R4.

4. Within the older normal (B5) group: logical (M1) and non-logical (M2) material in combination with reading--no recitation (R1), reading--verbal recitation (R2), reading--written recitation (R3), and reading--verbal and written recitation (R4).

   a. At practice level 3, the group using M1R2 had a lower mean than the group using M1R4; the group using M2R2 had a higher mean than the group using M2R4.

5. Within the oldest superior (B6) group: logical (M1) and non-logical (M2) material in combination with reading--no recitation (R1), reading--verbal recitation (R2), reading--written recitation (R3), and reading--verbal and written recitation (R4).

   a. At practice level 1, the group using M1R1 had a lower mean than the group using M1R3; the group using M2R1 had a higher mean than the group using M2R3.

   b. At practice level 2, the group using M1R3 had a lower mean than the group using M1R4; the group using M2R3 had a higher mean than the group using M2R4.

Task Meaningfulness X Amount of Material X Levels

The task meaningfulness, amount of material, and levels variables did not interact to affect learning performance. Table 31 contains germane data. With one exception, the F-ratios occurred at probability levels greater than .01. Paired comparisons revealed the following specific differences.

1. Within the oldest superior (B6) group: logical (M1) and non-logical (M2) material in combination with the whole (D1), pure parts (D2), and progressive parts (D3) methods.

   a. At practice level 3, the group using M1D1 had a lower mean than the group using M1D2; conversely, the group using M2D1 had a higher mean than the group using M2D2.

Table 31

Interaction Effect of Task Meaningfulness, Amount of Material, and Levels (MD within B) on Learning Performance

1. Probabilities of F-ratios Yielded by the Analyses of Covariance.

Analysis	Source Table #		Practice Level			
	ACV	MR	A1	A2	A3	A4
Within B1	8	--	>.01	>.01	>.01	>.01
Within B2	11	--	>.01	>.01	>.01	>.01
Within B3	14	--	>.01	>.01	>.01	>.01
Within B4	17	--	>.01	>.01	>.01	>.01
Within B5	20	--	>.01	>.01	>.01	>.01
Within B6[a]	23	24	<.01	>.01	<.01	>.01

2. Directions of Relationships Revealed by the Multiple Range Tests.

Analysis	Practice Level	M	Paired Comparison		
			D1:D2	D1:D3	D2:D3
a) W/B6	A1	M1	D1=D2	D1=D3	D2=D3
		M2	D1=D2	D1=D3	D2=D3
	A3	M1	D1<D2	D1=D3	D2=D3
		M2	D1>D2	D1=D3	D2=D3

Practice Distribution X Task Meaningfulness X Levels

The practice distribution, task meaningfulness, and levels variables did not interact to affect learning performance. The data listed in Table 32 reveal that the several pertinent F-ratios occurred at probability levels greater than .01.

Table 32

Interaction Effect of Task Meaningfulness, Practice Distribution, and Levels (MC within B) on Learning Performance

1. Probabilities of F-ratios Yielded by the Analyses of Covariance.

Analysis	Source Table #		Practice Level			
	ACV	MR	A1	A2	A3	A4
Within B1	8	--	>.01	>.01	>.01	>.01
Within B2	11	--	>.01	>.01	>.01	>.01
Within B3	14	--	>.01	>.01	>.01	>.01
Within B4	17	--	>.01	>.01	>.01	>.01
Within B5	20	--	>.01	>.01	>.01	>.01
Within B6	23	--	>.01	>.01	>.01	>.01

CHAPTER IV

DISCUSSION AND CONCLUSIONS

The purpose of this investigation--to study the effects and interaction effects of certain practice, subject, and task variables--was specified in Chapter I. The procedures used to accomplish this purpose were described in detail in Chapter II. The data collected and analyzed by these procedures were cited in Chapter III. In the present chapter, relationships indicated by these data are considered and generalizations are proposed.

Briefly, the results of the data analyses indicated that the following relationships obtained. Two practice variables, recitation type and amount of material, affected learning performance; the third, practice distribution, did not. The task variable, meaningfulness of material, did not affect learning performance. Among the subject variables: mental age affected learning performance; chronological age, intelligence level, and sex did not. Generally, no interactions occurred: in some cases, differences were present between groups formed by the several combinations of the practice, task, and subject variables; however, no evidence was located that these differences were consistently heterogeneous.

The discussion of these results includes a citation of factors which may have mediated the effects of the several variables and a consideration of the possible influence that each factor may have had on the relationships observed. The background for the discussion was based heavily upon the theoretical and empirical material presented by Hovland (1951), McGeoch and Irion (1952), Munn (1954), Underwood (1949), and Woodworth and Schlossberg (1954). The conclusions are limited explicitly to practice, task, and subject variables, to procedures, and to response measures similar to those used in the present investigation. In this restriction, the explanatory factors cited are emphasized especially.

The remainder of the chapter is organized in terms of topics representing the several research objectives which were delimited in Chapter I as following from the purpose of the investigation and which were used in Chapter III as a framework for summarizing relationships apparent in the basic or primary data. The format for each topic includes the following: results and related research--

description of specific results obtained in the present study, citation of previous pertinent research, and notation of consistency between the relationships reported in the present and previous research; proposal of explanatory factors relevant to the results; and statement of conclusions.

Effects of the Practice Variables

Recitation Type

Results and Related Research

Recitation type did effect learning performance at all four practice levels. Subjects who used combined written and verbal recitation performed more adequately than those who used written recitation, verbal recitation, or no recitation. Subjects who used written recitation performed more adequately than those who used verbal recitation or no recitation. Subjects who used verbal recitation performed more adequately than those who used no recitation.

The evidence that subjects who devoted some time to verbal recitation performed more adequately than control subjects who spent similar amounts of time continuing to read the material is consistent with information reported by such investigators as Forlano (1936), Gates (1917), Skaggs and Grossman (1930), and others. No previous investigations were located in which verbal, written, or combined written and verbal recitation were compared with reading but no recitation or with each other. Indirect evidence exists in the observation that kinesthetic stimulation leads to more effective learning than auditory and visual stimulation either singly or in combination (Barlow, 1928).

Explanatory Factors

Several factors have been posited to explain why recitation is conducive to more efficient learning. These include maintenance of an active attitude, practice of the material in the form it is to be used, and acquisition of knowledge of results. Relationships identified in the present study are discussed below in terms of these factors.

Maintenance of an active attitude.--When he recites, the subject is required to attend constantly to the material to be learned. Further, the more faculties he uses in this recitation, the more encompassing his attention to the material possibly becomes. Although learning without awareness is a recognized phenomenon, learning probably is facilitated by conscious attention to the material. In the present study, an attempt was made to keep the subjects who used the reading--no recitation variant in an active, attentive attitude. That is, the time they spent reading was controlled carefully. The subjects using all four recitation variants read the material aloud on 20% of the trials; on the remaining 80% of the trials, while the several groups who recited recalled the material in the various ways with prompting, the subjects who did not recite reread the material. This reading was paced at the same rate as the recitation of the other subjects, it was performed orally, and it was led by the investigator. Thus, efforts were made to prevent an open-ended, free choice situation in which a subject's attention could wander randomly. On the basis of maintenance of an active attitude per se, it is difficult to understand why the control subjects differed from those who used recitation. However, when the number of faculties involved is considered, it is possible that the subjects who used written recitation and combined written and verbal recitation maintained a more active attitude than the subjects who used verbal recitation and the control subjects; consequently, they should have learned more adequately. Nevertheless, if maintenance for active attitude is a crucial factor, then still unresolved is why the control subjects and those who used verbal recitation differed. Ostensibly, subjects in these two groups should have been using the same number of faculties, their attention should have been involved to a similar degree, and they should have learned to an equivalent extent.

Practice of the material in the form it is to be used.--When he recites, the subject is practicing the material in a form similar to the form in which he will use it specifically for testing; also, he is practicing the material in a form comparable to the form in which he may use it generally in those areas to which the information may be applied. In other words, he recalls the material in the presence of the stimulus units and in the absence of the response units. In the present study, the testing involved all subjects making a written response to a completion test. That is, the test list included only the stimulus syllables; these were read to the subject by the investigator as the subject looked at them; and the subject was required to write the response digit for each stimulus syllable. This factor, practice of the material in the form it is to be used, may help explain why the groups using written recitation and combined written and verbal recitation performed more adequately than the other two groups--their recitation required writing the responses in the presence of the stimuli and in the absence of the responses just as the test did. Also,this factor may help explain why the group using verbal recitation performed more adequately than the group using no recitation. Even though their recitation did not involve writing, it did require recalling the material in the presence of the stimuli and in the absence of the demonstrated correct responses. This factor does not seem to help explain why the groups using combined written and verbal recitation performed more adequately than the group using written recitation alone. Both groups had practiced recalling the material in the presence of the stimuli and in the absence of the demonstrated correct responses; for both,recitation involved actually writing the responses as they were required to do on the test.

Acquisition of knowledge of results.--When he recites in the absence of the correct responses, the subject potentially can obtain more accurate knowledge about the adequacy of his performance, *i.e.*, about the correctness of his responses. The stimulus-response pairs which he knows are confirmed and thus are reinforced; the stimulus-response pairs which he has associated erroneously are not confirmed and thus are not reinforced but isolated for correction; the stimulus items for which he does not know responses can be identified for further effort. In the present study, immediately after the subjects made their responses, the investigator supplied the correct responses; consequently, this confirmation process could operate--the subject could determine what he did and did not know. When the reading--no recitation variant was being administered, the investigator also supplied the correct response; and so, the number of times the subjects who used the several variants heard the correct response was held constant. However, the subjects who did not recite did not have a chance to test, so to speak, what they knew and did not know and experience this confirmation process. This factor, the acquisition of knowledge of results, is useful in explaining why the subjects who recited performed more adequately than subjects who did not. Not apparent, however, is the extent to which this factor is helpful in explaining the differences between groups who used the different types of recitation. The verbal recitation, written recitation, and combined verbal and written recitation variants involved progressively greater amounts of externalized, concrete recitation. Perhaps concomitantly, the three variants involved progressively more explicit knowledge of results. Possibly, this increase in explicitness of knowledge of results was associated with an increase in adequacy of learning. However, the influence of explicitness of knowledge of results does not seem to have been studied extensively. This influence would bear exploration in itself and in relation to explanation of the efficacy of various types of recitation.

Conclusion

The evidence obtained herein would seem to justify the following conclusion. Recitation type affects learning performance. Subjects who use combined written and verbal recitation perform more adequately than those who use written recitation, verbal recitation, or reading with no recitation. Subjects who use written recitation perform more adequately than those who use verbal recitation and reading with no recitation. Subjects who use verbal recitation perform more adequately than those who use reading with no recitation. This generalization is limited to situations similar to that involved in this investigation. The extent to which the explanatory factors discussed operated singly or in combination to mediate the observed relationships cannot be decided unequivocally without more direct evidence. Further research is indicated.

Amount of Material

Results and Related Research

The amount of material variable did affect learning performance. At the earlier practice levels, subjects using the whole method performed less adequately than those using the pure and progressive parts methods; at the last practice level, this relationship was reversed. At the practice levels during which they had had equal repetitions of the segments of material on which the tests were based, subjects using the pure and progressive parts methods performed with equivalent adequacy.

These data are inconsistent with the results reported by such investigators as the following: Griffiths (1938), C. O. McGeoch (1931), and Northway (1937), who found the three methods to be about equally efficient for most materials. The data are consistent, in a sense, with the work of such investigators as these: Brown (1924), Crafts (1929, 1930, 1932), and Steffens (1900), who found the whole method to be more effective than parts methods; and Pechstein (1918), Seagoe (1936a, 1936b), and Winch (1924), who found parts methods to be more effective than the whole method.

Explanatory Factors

These results are understandable when they are viewed within the context of a comment by McGeoch and Irion (1952).

> Several of the early experiments had found that practice yielded an increasing difference in favor of the whole method. For example, subjects would find a part method superior at the beginning of practice but the whole method more effective after practice. More recently, in a direct study of this condition, Wylie (1928) has shown that the advantage of the whole method increases with practice (pp. 501-502).

Such a method by practice level interaction was observed in the present study. Dynamics operant here could involve a number of factors. Several of these are the following: relative lengths of the wholes and parts, transfer of learning, influence of set, practice of the material in the form it is to be used, presence of retroactive inhibition or differential forgetting, amount of time exposed to the material, and length of time required to connect the parts. Relationships identified in the present study are discussed below in terms of these factors.

Relative lengths of the wholes and the parts.--Other things being equal, increases in the amount of material involved in a task, especially in a rote learning task, are associated with increases in the difficulty of the task or the amount of time required for learning (Hovland, 1940a; 1940b; Lyon, 1914; and Meumann, 1913). Among the reasons postulated for this result is the following. With shorter lists, the subject has less units to remember and integrate at any one time. Concomitantly, as success or confirmation occurs more rapidly, so does reinforcement and learning.

Understanding the applicability of this factor, relative lengths of the wholes and parts, to the relationships recounted herein will be facilitated by reiteration of the aspects of the procedure relevant to the amount of material involved in the wholes and parts at the several practice levels. Material presented in the description of these aspects of procedure in Chapter II[1] is quoted below.

> Subjects receiving the whole method were administered the entire list of nine pairs on each of the 40 trials. The test list administered after trials 10, 20, 30, and 40 was based on the nine pairs.
>
> Subjects receiving the pure parts method were administered the material according to the following trial schedule. Part I (first three pairs) was repeated for trials 1 through 10. After trial 10, the test list based on the part 1 pairs was administered. Part 2 (second three pairs) was repeated for trials 11 through 20. After trial 20, the test list based on the part 2 pairs was administered. Part 3 (third three pairs) was repeated for trials 21 through 30. After trial 30, the test list based on the part 3 pairs was administered. Parts 1, 2, and 3 combined (whole list of nine pairs) were repeated for trials 31 through 40. After trial 40, the test list based on the total list of nine pairs was administered.
>
> Subjects receiving the progressive parts method were administered the material according to the following trial schedule. Part I (first three pairs) was repeated for trials 1 through 10. After trial 10, the test list based on the part 1 pairs was administered. Part 2 (second three pairs) was repeated for trials 11 through 20. After trial 20, the test list based on the part 2 pairs was administered. Parts 1 and 2 (first six pairs) were combined for trials 21 through 25. Part 3 (third 3 pairs) was administered for trials 26 through 35. After trial 35, the test list based on the final three pairs was administered. Parts 1, 2, and 3 (whole list of nine pairs) were administered from trials 36 through 40. After trial 40, the test list based on the total list of nine pairs was administered.

When the data were analyzed statistically, scores were included for only those syllable-digit pairs which the subjects who used the three methods had in common. Thus, at the first three practice levels, the subjects using the whole method practiced the nine syllable-digit pairs; however, included in the analyses were only their scores on the respective segment of three syllable-digit pairs being considered.

In summary, the lists of syllable-digit pairs considered by subjects using the whole and parts methods differed in lengths at three of the four practice levels. This factor, relative lengths of the wholes and parts, is useful in understanding relationships which occurred at the earlier practice levels but not at the later practice levels. That is, at the earlier stages of practice, the subjects using the respective parts methods, which involved equivalent amounts of materials, performed with similar adequacy; both groups performed more adequately than subjects using the whole method, which involved three times the amount of materials they were using. However, at the last stage of practice, when all three groups were using the total amount of material to be learned, subjects who were using and had been using the parts methods continued to perform in a similar manner while both groups of subjects performed less adequately than those subjects who were using or had been using the whole method.

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[1] *Supra*, p. 37

The differences between the groups at the third practice level merit comment. Review of the procedure reveals that at the third practice level, the scores of the subjects using the progressive parts method reflected their performance on the third segment of the stimulus-response pairs after they had practiced this material only five trials. The other two groups had had 10 practice trials. As a result, the scores of the subjects using the progressive parts method probably are not comparable to those of the other two groups and can be eliminated from the generalization.

Transfer of learning.--Depending upon the characteristics of the material, either positive or negative transfer of learning may operate to affect the relative efficiency of the whole and parts methods. This transfer can be intralist, within the list, or interlist, between the lists. Intralist transfer often is operant with the longer lists used with the whole method and interlist transfer frequently occurs with the shorter lists used with the parts methods. In the present study, both intralist and interlist transfer probably did occur; further, the materials were so constructed that this transfer probably was positive and of a stimulus generalization type (Bruce, 1933; Gibson, 1941, Yum, 1931). That is, each list consisted of three categories of materials, each of which contained three stimulus--response pairs; each category was based on the initial letter of the nonsense syllable which was used as a stimulus. In the logical lists, the response units were divided into three categories also; each of these categories was based on the initial two digits of the three-digit response units. In these lists, categories of stimulus syllables were associated with categories of response digits--each initial letter in a stimulus syllable was associated with an initial number pair in a response digit. In the non-logical lists, three categories of stimulus syllables were extant; the response digits were not grouped according to initial number pair.

Interlist transfer possibly could have expedited the performance of the groups using the parts methods at two points: when they changed from part to part and when they combined the several parts into a whole. Intralist transfer possibly could have facilitated the performance of the groups using the whole method throughout the tasks. However, the extent to which transfer of learning exerted a differential influence on the obtained results is difficult to specify. Certainly, since the subjects who used the two parts methods practiced the same material, no differential in transfer could be expected. If interlist and intralist transfer did affect the results, then what must have happened is this: since subjects using the whole method were dealing with three categories and nine syllables simultaneously during the early practice stages, they may have required longer to perceive and/or take advantage of the transfer possibilities than the subjects using the parts methods who, though they were dealing with a similar number of categories, had a smaller number of elements to integrate at any one time. At the later stage of practice, for the subjects who used the whole method, intralist transfer may have become more operant: the categories may have been perceived and emphasis may have been put on learning the elements of material which could not be transferred. On the other hand, at this last stage of practice, the subjects using the parts methods may have had to spend time recalling the elements they had learned earlier and integrating them into the several categories. At the same time, they probably were not influenced by intralist transfer which, while it was potentially facilitative, required time to perceive and/or use. Further, they had to concentrate on the several elements which could not be transferred. If these dynamics occurred, then it could be expected that subjects using the whole method would perform less adequately initially and more adequately later in practice.

Whether these dynamics occurred is difficult to decide. Only very indirect evidence exists. The subjects using the progressive parts method had experience combining and integrating shorter lists than subjects using the pure parts method and the whole method; and they had had this combining experience earlier than subjects using the pure parts method. If a differential response attributable to transfer of learning were going to occur at the last stage of practice, it seems that subjects who used the progressive parts method would have performed in an intermediate range between the other two groups. That is, if intralist transfer occurred but required several exposures for maximum benefit, then they should have begun to show such benefit from the experience of integrating the first two-thirds of the list earlier in practice and having only the last third to integrate at the last practice level. Perhaps, the dynamics of transfer would have operated in a more obvious manner had the tasks been less balanced in terms of materials. McGeoch's and Irion's (1952), statement about the problem seems a suitable summary point here.

> Experimenters have observed the presence of transfer, and it is almost certainly an important condition of results on the whole-part problem. From our knowledge of both positive and negative transfer as a function of the relations between materials it is to be expected that the influence of the character of the material used and of transfer need to be considered together. Insufficient quantitative data are available upon transfer in the setting of the present problem to permit a generalization (pp. 505-506).

Influence of set.--Other things being equal, once a set is established, a change in set can cause confusion about goals and methods of practice developed while a prior set was operating; in turn, this confusion may interfere with learning. Applied to the whole-part problem, the possible deleterious effects of altering sets can be expected to be manifest primarily at the stage of practice when the parts must be combined into a whole. That is, subjects using a parts method should be oriented toward learning small units of material; when they must shift this orientation to integrating and learning long lists of material, possibly negative transfer related to attempting to apply an old set in a new situation could occur (Hamilton, 1950; Irion, 1948; Thune, 1950). Subjects using the whole method throughout the tasks, of course, should not be influenced by these dynamics.

In the present study, efforts were made to prevent a differential influence of changing sets. The subjects using the parts methods were told explicitly that the entire task consisted of nine syllable-digit pairs, that they first would work on parts separately, and that they then would combine the parts into a whole. The idea here was that the best way to prevent negative influences ascribable to changing sets was to inform the subjects fully about what would happen before it happened and what was happening while it was happening. Nevertheless, the less adequate performance at the last practice level of the subjects using the parts methods in comparison to those using the whole method would seem to lend credence to the notion that changing sets might have exterted a detrimental effect. On the other hand, the relative performance of the subjects using the progressive parts method constitutes contradictory evidence. That is, subjects using the progressive parts method had had practice combining and integrating shorter lists than the subjects using the pure parts and the whole methods. Also, subjects using the progressive parts method had begun combining parts earlier in the practice sequence than subjects using the pure parts method. Had alteration of set related to changing from learning the parts to learning the whole been operating, it would seem that the subjects using the progressive parts method would have performed at a level intermediate between the other two groups. This did not occur.

Practice of the material in the form in which it is to be used.--Generally, the more opportunity the subject has to practice the material in the form in which it is to be used for a test or for other purposes, the more adequately he should perform in the situation involving such use. In the present study, this factor pertains to the performance of the subjects at the last stage of practice.

At the last practice level, all subjects were tested on the entire list of nine syllable-digit pairs. Prior to this, the subjects using the whole method had practiced the entire list for 30 trials and had responded to the test list three times. Before the last practice level, the subjects using the pure parts method had practiced only one third of the list at any one time and had seen only part of the test list at any one time; however, they had been exposed to all of the material both in practice and in test form even though they had not seen it as an entire set of material. Again, the subjects who used the progressive parts method represented a crucial control variation. Prior to the final test, they had been exposed to the parts, or to each third of the material, separately and to two of the parts or thirds of the material combined. If practicing the material in the form in which it was to be tested or used were influential in the obtained results, then it seems that the subjects using the whole method would have performed most adequately, and that the subjects using the pure and progressive parts methods would have differed in performance. This did not happen entirely. Subjects using the whole method did perform most adequately, however, subjects using the two parts methods did not differ in performance.

Presence of retroactive inhibition or differential forgetting.--When subjects practice a task, then leave that task to practice a subsequent task, and then return to the original task, material learned subsequently may interfere with retention of material in the original task. The likelihood of such retroactive inhibition is increased when the task materials are highly similar (Kennelly, 1941; McKinney, 1935; Zangwill, 1938). In the present study, retroactive inhibition could have been influential in the differential results obtained at the last practice level. The subjects using the whole method had been practicing the entire list each trial. On the other hand, subjects using the parts methods had practiced a segment of the material, left that to practice the next segment, etc. At the last practice level, when they had to integrate the several parts as a whole, it is possible that they had forgotten aspects of the material to which they had been exposed early in practice. As stated previously relevant to the discussion of proactive facilitation or positive transfer of learning, the task materials within each list, and thus between the parts, were organized in terms of categories, which rendered them highly similar in terms of both stimulus elements and response elements. Therefore, possibly, as they tried to combine and integrate and, to some extent, relearn the earlier parts, the highly similar material they had learned subsequent to their initial learning of that material exerted a deleterious effect. However, there are two arguments contrary to this idea. First, degree of retroactive inhibition is related negatively both to the extent that the original material is learned and to the extent that the interpolated material is learned (Lahey, 1937; McGeoch, 1929, 1932; Thune and Underwood, 1943; Underwood, 1945). Subjects using the parts methods had 10 trials to practice each segment of material and these segments consisted only of three syllable-digit pairs. Most of the subjects employed seemingly could have attained a fairly adequate level of mastery of such small amounts of material in such a large number of trials. Consequently, they should not have been highly susceptible to retroactive inhibition. Second, retroactive inhibition is relatively transitory; it disappears rapidly when the subjects begin practicing again on the original material. (Thune and Underwood, 1943; Underwood, 1945). Subjects using the progressive parts method had practice combining and integrating, as well as relearning, the original two-thirds of the material before the fourth practice level was initiated; on the other hand, subjects using the pure parts method did not begin relearning until the final practice level and they had to combine and integrate all three parts at once. Consequently, subjects using the progressive parts method should have been affected by retroactive inhibition less at the final practice level than subjects using the pure parts method. Therefore, if retroactive inhibition had been the crucial factor, it would seem that subjects using the progressive parts method would have performed at a level intermediate between the other two groups. This did not happen.

Amount of time exposed to the material.--Other things being equal, a positive relationship exists between number of reinforced repetitions of material to be learned and adequacy of learning. A possible negative influence which might operate to vitiate this relationship is the following: in some cases involving inordinately large amounts of material, excessive repetitions may result in boredom and fatigue which, in turn, may exert a deleterious effect on performance adequacy (Hull, 1943; Hull, 1950; McGeoch and Irion, 1952; Melton, 1941).

In the present study, this factor, amount of time exposed to the material, possibly could have operated at the later practice stages to the advantage of subjects using the whole method. That is, at the first stage of practice, the subjects had a similar number of repetitions of the segments of material they were practicing. However, beginning at the second stage of practice, the subjects using the whole method began to have more exposures to each part while the subjects using the parts methods had a similar number of exposures. After the trials on which subjects using the progressive partsmethod combined the materials, the subjects using the two parts methods differed in number of exposures to the first six syllable-digit pairs. In summary, after they had finished the 40 trials, the several groups had been exposed to the stimulus-response pairs different amounts of time. Further, there was no reason to expect fatigue and boredom to occur to a great extent. Among other reasons, the tasks were not excessively long; the number of repetitions was not extremely large; and the rate of presentation was not exceedingly fast.

If amount of time exposed to the material were going to exert an influential effect, then the subjects using the whole method should have begun to exceed the subjects using the parts methods at the end of the second stage of practice and the subjects using the pure and progressive parts methods should have differed at the fourth practice level. Neither of these events happened.

Length of time required to connect the parts.--McGeoch and Irion (1952) maintained that combining the several segments after they have been learned is rather difficult and that the relative superiority of parts methods early in practice often is erased at the stage at which the parts must be combined. Among factors which McGeoch and Irion proposedas possibly instrumental in this difficulty are factors discussed previously herein: retroactive inhibition and negative transfer of set. Some contraindications that retroactive inhibition and negative transfer of set operated in this study were cited earlier. When the procedures were being administered, the subjects were given explicit information about combining parts. Also subjects using the pure parts method were given trials for learning each section of the materials and trials for combining the several sets; presumably, in this time, they learned the material adequately. The subjects using the progressive parts method were given practice on each part and practice in combining parts 1 and 2 as well as practice in combining all three parts.

If time required to combine the parts were going to operate as a differential factor, then at the last practice level the group using the whole method should have exceeded the groups using the parts methods; this happened. In addition however, the group using the progressive parts method should have differed from the group using the pure parts method; this did not happen.

Conclusion

The evidence obtained herein would seem to justify the following conclusion. Amount of material affects learning performance. At early stages of practice, subjects who use the whole method perform less adequately than subjects who use parts methods; at later stages of practice, subjects who use the whole method perform more adequately. At the several stages of practice, subjects who use pure parts and progressive parts methods perform with similar adequacy. This generalization is limited to situations similar to that involved in this investigation. The role of the several explanatory factors discussed in mediating the observed relationships would bear further study in subsequent research.

Practice Distribution

Results and Related Research

Practice distribution did not affect learning performance. At all practice levels, subjects who used massed and distributed practice performed with similar adequacy. These results are consistent with evidence obtained by such investigators as Epstein (1950) and Gentry (1940). They are inconsistent with data reported by such investigators as the following: Kientzle (1946) and Kimble (1949), who found that subjects using distributed practice performed more adequately than those using massed practice and Bell (1942) and Cook (1944), who found that subjects using massed practice peformed more adequately.

Explanatory Factors

Variations among results of the several studies need to be considered in terms of a number of factors. Generally, investigators differed in terms of what they labeled massed and distributed practice. What was labeled distributed practice in one study resembled massed practice in another and vice versa (McGeoch and Irion, 1952). Further, certain conditions have been identified as favoring massed practice; other conditions, distributed practice. Among these conditions or factors are the following: opportunity for warm-up, usefulness of response variablility, presence of differential fatigue and motivational variations, possibility of intralist interferences and differential forgetting, and possibility for surreptitious practice.

Opportunity for warm-up activities.--In some cases, when a subject begins to work on a task, he requires time to warm up: that is, he has to acquire a set or orientation about the goal of the task and the nature of the material, he has to become attentive and start concentrating, etc. Massing of practice probably is helpful in this warm-up process, whereas the interpolated intervals of non-practice involved in distributed practice probably are inimical. Therefore, massed practice is often quite helpful in learning material for which a warm-up period is useful. Inthe present study, explicit directions were given about the goal of the tasks, the types of material involved, the activites required of the subjects, etc. Further, the tasks were relatively short. Therefore, warm-up periods may not have been necessary. If warm-up periods had been necessary or had been an influential factor, then it seems that the subjects using massed practice would have begun to show differences at the later stages of practice. This did not happen. Another possibility which must be considered, however, is this. Perhaps, warm-up periods were useful in performing the tasks; and, perhaps, the interpolated rest intervals were so short that they did not act to interfere with this warm-up activity.

Usefulness of response variability.--Discovery of and facilitation of correct responses in some tasks--especially problem-solving, concept formation, and discrimination learning tasks--seem to be facilitated when the subject has the opportunity to vary his responses or make a number of different provisional tries. Massing of trials often is associated with response variability. Thus, on tasks on which response variability is helpful, massed practice more frequently is conducive to learning than distributed practice (Erickson, 1942). In the present study, the tasks were such that response variability and provisional tries probably were not helpful. Rote learning was used and the materials were presented in paired associate form. On each trial, the investigator read the stimulus--response pair and then the stimulus again; next, the subjects supplied the response digit; and the investigator read the response digit again. Further, if this were a crucial factor, then it would seem that the subjects administered massed and distributed practice would have differed during the early stages of practice when initial learning probably was occurring if not during the later stages. This did not happen.

Presence of differential fatigue and motivational variations.--When long lists of material and a large number of repetitions are used, massed practice sometimes leads to fatigue and boredom. This fatigue and boredom, in turn, can be detrimental to performance. On the other hand, when such materials are being used, distributed practice may be conducive to the dissipation of these influences. Further, this dissipation of fatigue and boredom may be accompanied by increased attentiveness and alertness which are manifested in more adequate task performance. When the procedures for the present study were being planned and the tasks were being developed, this factor was taken into consideration. One criterion used in task construction was that the tasks be relatively non-fatiguing for subjects in the age groups sampled. Thus, the tasks were pilot-tested extensively to determine which list lengths and numbers of trials were optimum for obtaining an adequate sample of behavior while not being unduly tiring to the subjects. Also, the rate of presentation was paced at a moderate speed. During the tasks administrations, observational evidence was not obtained that a large number of the subjects seemed to become excessively tired or bored. Further, if this factor were going to operate, subjects administered the two practice distribution variants should have differed in performance at the latter practice levels when fatigue and boredom, if they were going to occur, should have been at a maximum. This did not happen. On the other hand, perhaps the interpolated periods of non-practice were so short that fatigue and boredom, if they did occur, did not have enough time to dissipate. Similarly, the interpolated rest periods may have been so short that fatigue and boredom occurred as much in the subjects using the distributed practice variant as they did in the subjects administered the massed practice variant. Yet, here again, observational data indicating excessive fatigue and boredom did not exist to any great extent. Also, the length of the interpolated periods of non-practice used for the distributed practice variant was that suggested as a conventional design by Hovland (1951). Further, this design has been used by investigators who did report differences in performance adequacy among subjects using the two practice distribution variants (*e.g.*, Kientzle, 1946).

Possibility of intralist interferences and differential forgetting.--During practice, because of intralist interferences and other reasons, subjects may learn not only correct responses but also incorrect responses. However, other things being equal, since correct responses are reinforced positively, they tend to be more thoroughly learned or associated than incorrect responses which are not reinforced positively (Hull, 1943; Hull, 1950; Melton, 1941; and McGeoch and Irion, 1952). During periods of interpolated non-practice, forgetting can be expected to occur. Rate of forgetting is negatively related to degree of initial learning (Lahey, 1937, Thune and Underwood, 1943, and Underwood, 1945); therefore, conflicting or incorrect responses, which tend to be less thoroughly learned, can be expected to be forgotten more rapidly than correct responses. Further, when the subjects resume practice, the correct responses are reinforced again while the incorrect responses are not. Distributed practice should be a more favorable condition than massed practice for this differential forgetting to occur. Hovland (1939; 1949) demonstrated that less intralist interferences occur when tasks are presented in paired associate form rather than in serial form; he also reported that less interference occurs with longer presentation rates than shorter presentation rates. In the present study, materials were presented in paired associate form and at a fairly slow rate. Also, as discussed earlier, the internal construction of the tasks used herein was such that intralist interferences or negative transfer probably was at a minimum. In addition, the length of the lists and the number of repetitions used herein were relatively small. For all of these reasons, the probability of intralist interferences possibly was minimal. Thus, differential forgetting during interpolated rest periods may not have been necessary. However, if differences between the subjects were going to occur as a result of this factor, they should have happened at a later practice level as intralist interferences, if existent, would have had a chance to build up and exert an inimical effect. No such differences were isolated.

Possibility for surreptititous practice.--In some situations during interpolated periods of non-practice, subjects have opportunity for additional overt recitation or for non-overt recitation. The advantage accruing for explicit recitation has been demonstrated. Implicit recitation also might be useful. Such implicit recitation could result in subjects using distributed practice performing more adequately than subjects using massed practice who do not have similar opportunities for recitation. When the present study was being designed, the possibility of such uncontrolled recitation or practice was considered and procedures were planned to prevent its operation. Subjects administered the distributed practice variant were required, during the periods of interpolated non-practice, to participate in an activity which involved naming pictures. This activity probably minimized the subjects' opportunities to engage in implicit, uncontrolled recitation. In addition, the picture naming activity possibly also helped to maintain the subjects' set to perform, that is, to keep them in an active attentive attitude. Further, if this factor were going to operate to influence performance, the groups using the two practice distribution variants probably would have differed in performance adequacy at the later practice sessions after the subjects using distributed practice had had several opportunities for implicit recitation during periods of interpolated non-practice. Such differences did not occur.

Conclusion

The evidence obtained herein would seem to justify the following conclusion. Practice distribution does not affect learning performance. Subjects who use massed and distributed practice perform with similar adequacy. Further research would be necessary to specify the extent to which the explanatory factors discussed or other similar factors operated singly or in combination to mediate the observed relationships.

Effect of the Task Variable

Task Meaningfulness

Results and Related Research

The task meaningfulness variable did not affect learning performance. Subjects using logically related materials did not differ in performance from those using non-logically related materials. These data are inconsistent with results reported by such investigators as Cofer (1941), Hilgard, Irvine, Whipple (1953), and Katona (1940). They are consistent with results reported by other investigators, *e.g.*, Davis (1937).

Explanatory Factors

As McGeoch and Irion (1952) pointed out: "The use of the logical method is commonly superior to the rote method but this need not be universal" (p.479).

Among the factors which might be postulated as mediating subjects' responses to the two types of materials are the following: influence of set, nature of the organizational principle and the materials, and similarity between the logical and non-logical materials.

Influence of set.--Other things being equal, subjects who are given specific instructions or a set relevant to a task could be expected to learn the material more adequately than a subject who is not given a set (Biel and Force, 1943; Postman and Senders, 1946; and Woodworth, 1915). Such a set may pertain to the following: the goal of the task, a general principle to be located, the specific activities implicit in the task, *etc.* In some cases in which the effect of using a logical method is compared to the influence of using a rote method, considerable differences occurr- between the sets or instructions furnished the two groups of subjects. Subjects using the logical method often are told to look for the underlying principle, the manner in which the material is organized *etc.* Conversely, subjects using the rote method often are given no set; they merely are assigned a body of material to be learned. Few comments are made about organizing the material or, for that matter, little information is supplied about how the several task activities are learned. Such a variation in set could lead to a difference in the orientation of the subjects to the tasks, the extent to which they attend to small cues, the amount of activity which they exert, *etc.* In the present study, remarks about an underlying principle were balanced in the directions given to subjects using both types of material. Subjects who used the logical method were told that the material was organized according to a principle, and that they were to look for that "trick" or principle. There was ancedotal evidence that the subjects did this: many commented when they had found the principle or when they thought they had. Conversely, subjects who used the non-logical method were told that there was no "trick" or principle, and that they were to try to memorize the material rather than to try to depend on any organizational principle. Thus, they began and performed the task with an active set just as subjects using the logical material did. This active set could have operated to make one group of subjects learn as rapidly as the other.

Nature of the organizational principle and the materials.--In the present study, the principle used was such that once it had been determined, the subjects still had to learn some of the material by arbitrary association. That is, the logical tasks were not all-or-none situations--such as some types of problem solving, concept formation, and discrimination learning situations are--so that once the principle had been determined all perfect responses would follow. Instead, the principle was that catgegories of stimulus syllables classified by initial letters were associated with categories of response digits classified by initial pairs of numbers. After they determined this, the subjects who used the logical materials still had to learn the final two letters in the stimulus syllables and the final number in the response unit. The material classified as non-logical consisted of stimulus syllables grouped according to initial letters. The response digits were not categorized. Subjects who used non-logical materials had to learn the final two letters of the stimulus syllables and all three numbers in the response unit.

The results indicate that, in the time allowed and with the number of stimulus response units involved, discovery and use of the principle, if they occurred, did not yield a sufficient advantage to enable the subjects to perform more adequately. Had the lists consisted of more material, perhaps the subjects performing entirely by rote would not have been able to acquire the material so rapidly; had more time been allowed, perhaps subjects able to use the organizational principle would have been able to capitalize on their advantage.

Similarity between logical and non-logical materials.--As described previously, the stimulus material in both lists consisted of three categories of syllables classified by initial letter. In the logical lists, the response units in each category were classified by the initial two numerals; in the non-logical lists, this was not the case. Thus, although slightly more probable within the lists of logically related material, intralist positive transfer was possible for both lists. Further, some organization was possible within the non-logical lists. Subjects could reduce them to three categories. That is, subjects responding to the non-logical lists had to learn only several more additional digits than subjects responding to the logical lists. Thus, the two lists were balanced fairly well in terms of disparate elements. As described previously, after the two sets of material were pilot-tested and revised several times, they were administered to new groups of subjects to determine whether they were equivalent in terms of difficulty. In this additional testing, all references to any organizational principle were removed. Subjects required equivalent numbers of trials to learn the several lists. Therefore, the lists were considered to be equivalent in terms of difficulty. Perhaps, if the lists had contained more disparate materials or had been less balanced in terms of elements, then differences would have occurred in the criterion situations where the subjects were exposed to the different comments relevant to meaningfulness. This was recognized as a possibility when the materials were being developed. However, it was considered that this would constitute a spurious relationship or difference. The interest herein was in the effect of using an organizational principle when all other factors were held as constant as possible.

Conclusion

The evidence obtained herein would seem to justify the following conclusion. Task meaningfulness does not affect learning performance. Subjects who use logically related materials do not differ in performance from those who use non-logically related materials. This generalization is limited to situations similar to that involved in this investigation. The extent to which the explanatory factors operated either singly or in combination to mediate the observed relationships needs additional examination in subsequent research.

Effects of the Subject Variables

Levels

Results and Related Research

Mental age did affect learning performance, chronological age and intelligence level did not. When MA was held constant and CA and IQ were varied, the groups, who differed in intelligence and chronological age levels, performed in a similar fashion. When CA was held constant and IQ and thus MA were varied, the more intelligent subjects, who also had the higher MA's, performed more adequately. When IQ was held constant and CA and thus MA were varied, the older subjects, who also had the higher MA's, performed more adequately.

Three areas of research related to the levels variable were reviewed. One area involved a model in which CA was held constant and IQ and MA were varied; another, a model in which IQ was held constant and CA and MA were varied. The results of the present study are consistent with data reported by investigators using these models who reported that adequacy of learning performance increased as CA and IQ (and, in both cases, either implicitly or explicitly, MA) increased (*e.g.* Heidbredder, 1928; House and Zeaman, 1958; Stroud and Maul, 1933, and Wilson, 1928).

The third area of research included studies in which the model involved holding MA constant and varying CA and IQ. The data obtained herein are not inconsistent with results emanating from these studies. Results of the earlier studies indicated that retarded, normal, and superior subjects who had equivalent MA's showed certain similarities and differences in performance. When the tasks employed involved a large degree of the motor component and a small degree of the verbal or oral component, retarded subjects performed more adequately. Conversely, when tasks involved more of the verbal or oral component, the following results were obtained. The three groups performed with equivalent adequacy on tasks considered low in complexity. As the tasks were increased in complexity, the more intelligent subjects performed more adequately (*e.g.* Blake, 1959). In the present study, only one type of task was used: this involved paired associate rote learning of syllable-digit units. An attempt was made to hold other conditions constant.

Results of previous research in which the subjects were compared in terms of their performance adequacy on paired associate rote learning tasks include the following. Johnson (1958) reported that retarded subjects exceeded normal subjects in performance on a letter-digit substitution task which involved only written responses. Blake (1959) confirmed this and demonstrated that both groups exceeded superior subjects in performance on this type task. Blake (1959) observed that on a task which consisted of pairs of nonsense syllables and which involved only oral responses retarded subjects performed less adequately than normal and superior subjects while the latter performed with equivalent adequacy.

Explanatory Factors

Among factors to which the discrepancies in results yielded by previous studies and the present investigation can be attributed are differences among tasks and task requirements. These include motor facility required for task performance, nature of the testing situation, and activity required to determine the correct response.

Motor facility required for task performance.--When successful performance on tasks involves a motor component or manual manipulation of task materials in conjunction with speed-time relationships, chronologically older subjects can be expected to perform more adequately than younger subjects. Other things being equal, increase in facility of eye-hand coordination, etc. are related to increase in chronological age. In previous investigations, when subjects who had lower intelligence but higher chronological age performed more adequately on paired associate rote learning tasks than subjects who had higher intelligence but lower chronological age, task performance involved a considerable motor component and performance adequacy was assessed by output in relation to time. The tasks used in the present study involved a minimum of the motor component. Also, timing was controlled carefully. Each subject was given the same amount of time to consider each stimulus and to make a response. This was the case when both the practice trials and the test lists were being administered.

Nature of the testing situation.--Bijou (1952), Cameron and Magaret (1951), and Sarason and Gladwin (1961) all have contended that in test situations, especially those involving verbal materials, retarded subjects, who often have had past experiences of difficulty and failure in such situations, possibly experience anxiety related to anticipation of failure which might be detrimental to their performance while normal and superior subjects, who often have not had such failure experiences, do not succumb to these dynamics. In cases in which this occurs, retarded subjects may be expected to respond less adequately. In a previous research situation (Blake, 1959), retarded subjects did respond less adequately than subjects who had higher intelligence on tasks which involved verbal interactions and individual face-to-face contacts between the investigator and the subjects. However, at the same time, there was no evidence that these retarded subjects responded more negatively to failure information than did normal and superior subjects. In addition, there was no evidence that the retarded subjects who received failure information performed less adequately than retarded subjects who did not receive such failure information. The tasks used in the present study were administered to small groups of subjects and the face-to-face contact between the subject and the examiner was not excessive. Further, on the tests, although the examiner read the stimulus items aloud, the subjects responded by writing in task booklets.

Activity required to determine the correct response.--In previous research in which retarded subjects have performed less adequately than normal and superior subjects on tasks involving rote learning of paired associates (Blake 1958, 1959), the subjects had to discover the correct response. That is, they had to begin by guessing, and through a confirmation procedure, gradually to determine the correct response. Possibly necessary for adequate performance in this type of activity is a repertory of responses. Subjects who differ in intelligence may differ in the extent to which they possess or can use such a response repertory. However, in the present investigation, the tasks employed involved very little of the process of discovery. Instead, a demonstration model was used. The investigator read the correct stimulus then the correct response. Next, the investigator read the stimulus again and the subject supplied the response. Then, the investigator read the response again. Whether the relationships observed here would obtain on task involving more complex materials has not been demonstrated so far. Also, the relative facility with which the groups can use different methods for determining responses does not seem to have been studied so far. However, these problems are being investigated and information should be available in the future (Blake, 1964).

Conclusion

The evidence obtained herein would seem to justify the following conclusion. Mental age affects learning performance, chronological age and intelligence level do not. When mental age is equivalent and chronological age and intelligence level vary, retarded, normal, and superior subjects perform with similar adequacy. When chronological age is equivalent and mental age and intelligence level vary, retarded subjects perform less adequately than normal subjects, and both groups perform less adequately than superior subjects. When intelligence level is equivalent and mental age and chronological age vary, younger subjects perform less adequately than subjects of an intermediate age, and both groups perform less adequately than still older subjects. This generalization is limited to situations similar to that involved in this investigation. The extent to which the several explanatory factors discussed operated singly or in combination to mediate the observed relationship requires further investigation in subsequent research.

Sex

Results and Related Research

Sex did not effect learning performance. Males and females responded with similar adequacy. These data are not consistent with information reported by such investigators as Conrad and Jones (1931), Easby-Grave (1924), Pyle (1925), and Young (1922), who observed that males and females differed in performance. The evidence is consistent with the results obtained by such investigators as Boynton (1931), Hicks (1931), Mattson (1933), McGinnis (1929), Perl (1933), and Weig (1932), who reported that males and females did not differ in response to tasks involving learning.

Explanatory Factors

Among explanatory factors which pertain are the nature of the tasks in relation to possible differences in the interests and training and experience of the subjects, and the motor facility required for task performance.

Interests and training and experience of the subjects.--Interests and previous training and experience are influential in learning performance. Probably operant here are the processes of motivation and transfer. Males and females differ in interests, etc. Therefore, it is reasonable to expect that sex differences would occur in response to materials which differ in the extent to which they are weighted in favor of males or females in respect to these factors. These expectations have been confirmed (Bassett, 1929; Boynton, 1931; Pyle, 1925). However, in the present study, efforts were made to develop tasks which would be neutral in these respects. For example, this was one reason that nonsense syllables and digits were employed.

Motor facility required for task performance.--As described earlier, on tasks which involve manipulation of task materials, motor facility exerts an important influence in performance adequacy. This is especially the case for tasks in which speed is important. In many cases, males and females differ in motor facility. Thus, they could be expected to differ on tasks which involve a motor component and speed-time relationships.

As stated previously, in the present study, the tasks did involve writing. However, speed was not a factor since the timing of the subjects responses was carefully controlled.

Conclusion

The evidence obtained herein would seem to justify the following conclusion. Sex does not affect learning performance. Males and females respond with similar adequacy. This generalization is limited to situations similar to that involved in this investigation. The extent to which the explanatory factors discussed operated singly or in combination to mediate the observed relationships would bear further direct study in subsequent research.

The Interactions

Results and Related Research

The analyses yielded no evidence that any consistent interactions occurred. In most cases, differences did occur among the performance of the following: subjects who were administered the several combinations of the practice and task variables (levels variable ignored); subjects within the several levels groups who were administered the several combinations of the practice and task variables; and subjects classified according to the several levels and sex categories (practice and task variables ignored). However, examination of these differences did not reveal them to be consistently heterogeneous in the necessary or expected manner.

These results are inconsistent with information reported by the following: Crafts (1930), Davis and Meenes (1932), Pechstein (1917), and Winch (1924), who found that amount of material and practice distribution interacted to affect learning performance; Northway (1937), Seagoe (1936a), and Seagoe (1936b), who observed that amount of material and type of task tended to interact to affect learning performance; Gates (1917), and Peterson (1944), who noted that recitation type and type of task tended to interact to affect learning performance; and G. O. McGeoch (1931) and Pechstein (1926), who reported some evidence that mental maturity level and whole-part approaches tended to interact to affect learning performance. No previous research was located in which the other interactions of interest herein were studied directly.

Explanatory Factors

The several explanatory factors suggested above relevant to the single effects of the several variables would seem to be equally germane here. Direct evidence does not exist to support an unequivocal decision about which, if any, of the explanatory factors discussed operated singly or in combination to affect the results. Further research would seem necessary.

Conclusions

In the absence of direct contradictory evidence, the following generalizations would seem justified. The several combinations of practice, task, and subject variables do not interact to affect learning performance. Specifically, the combinations of variables to which this generalization applies are the following: the practice variables--recitation type X amount of material, recitation type X practice distribution, and amount of material X practice distribution; the subject variables--levels X sex; the practice and task variables--recitation type X task meaningfulness, amount of material X task meaningfulness, and practice distribution X task meaningfulness; the practice and subject variables--recitation type X levels, amount of material X levels, practice distribution X levels, recitation type X amount of material X levels, recitation type X practice distribution X levels, and amount of material X practice distribution X levels; the task and subject variables--task meaningfulness X levels; the practice, task, and subject variables--

recitation type X task meaningfulness X levels, amount of material X task meaningfulness X levels, and practice distribution X task meaningfulness X levels. These generalizations are limited to situations similar to that involved in the present investigation.

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CHAPTER V

SUMMARY

Problem

Purpose and Objectives

The purpose of this investigation was to study the effects and interaction effects of selected practice, task, and subject variables on learning performance. Research objectives delimited as consequent to this purpose pertained to examining the following.

1. Effects of the practice variables on learning performance.
2. Effect of the task variable on learning performance.
3. Effects of the subject variables on learning performance.
4. Interaction effects of the practice variables on learning performance.
5. Interaction effect of the subject variables on learning performance.
6. Interaction effects of the practice and task variables on learning performance.
7. Interaction effects of the practice and subject variables on learning performance.
8. Interaction effect of the task and subject variables on learning performance.
9. Interaction effects of the practice, task, and subject variables on learning performance.

Educational Significance

One of the educator's primary responsibilities is to select and present experiences conducive to the student's achieving intellectually at a level commensurate with expectations based on his assessed capacity and to his becoming increasingly self-directed or self-motivated in this process. Fulfilling this responsibility is a major concern of those who seek to achieve the goal of excellence through an educational framework designed to foster in each student the ability to use his talents effectively in the process of satisfying his own personal needs and of contributing to the society of which he is a member. A problem is posed, however, by evidence that this goal is not being attained to a desired extent. This problem is especially crucial for educators and solutions are contingent upon examining some of its bases. Doing so involves studying a number of facets of the educational process. One important facet is conditions related to learning. To study certain of these conditions, the present investigation was undertaken.

Related Research

Research reviewed encompassed investigations focussed on the manner in which practice, task, and subject variables affect, and interact to affect, learning. Specifically, investigations cited included work immediately germane to the problem delimited for the present study: to examine whether several independent variables--recitation type, amount of material, practice distribution, task meaningfulness, mental age, chronological age, intelligence quotient, and sex--either singly or in combination influence the dependent variable, learning performance.

Procedure

Experimental Design

Practice, task, and subject variables were the major components of the experimental design. The subject variables encompassed mental age, chronological age, intelligence level, and sex. The practice variables were recitation type, amount of material, and practice distribution. The recitation type variable included reading with no recitation, reading with verbal recitation, reading with written recitation, and reading with combined written and verbal recitation. The amount of material variants consisted of the whole method, the pure parts method, and the progressive parts method. The practice distribution variable involved massed and distributed practice. The task variable was extent of task meaningfulness; in terms of this variable, the tasks were dichotonized into those composed of logically related materials and those composed of non-logically related materials.

The amount of material and practice distribution variables were combined to form six sets of variants: whole method--massed practice, whole method--distributed practice, pure parts method--massed practice, etc. Similarly, the task meaningfulness and recitation type variables were combined and this combination necessitated eight tasks. The primary characteristics of these tasks were determined by the pairs of variants involved: non-logically related material--reading with no recitation, logically related material--reading with no recitation, non logically related material--reading with verbal recitation, etc.

Definitionsof Terms

For the purposes of this investigation, the following definitions of terms were employed in reference to the subjects, the tasks, and the practice variables.

Subjects

1. Mental age. Index reflecting the total number of items the subject successfully completes on the Form L of the Stanford-Binet Test of Intelligence, 1937 revision.
2. Chronological age. Age determined by subtracting the subject's birth date from a specified date prior to the initiation of the task administration.
3. Intelligence level. Index reflecting the relative status of the subject in the normative population for a standardized intelligence test.
4. Intellectually retarded subjects. Subjects whose intelligence levels are within the limits of 50 to 75.
5. Intellectually normal subjects. Subjects whose intelligence levels are within the limits of 90 to 110.
6. Intellectually superior subjects. Subjects whose intelligence levels are 120 or higher.

Tasks

1. Learning performance. Change in the learning response measure in the expected direction as a function of repetition (McGeoch and Irion, 1952).

2. Meaningfulness. Extent of a logical relationship existing among task materials (Guilford, 1927).

    a. Logically related task materials. Task materials which are arranged according to a pre-established pattern. They are amenable to organization.

    b. Non-logically related task materials. Task materials which are arranged in random sequence rather than according to a pre-established pattern. They are not amenable to organization.

Practice Variables

1. Recitation type. Manner in which the material to be learned is recalled in the absence of exposure or presentation of the material (McGeoch and Irion, 1952, p. 507).

    a. Reading--no recitation. Method in which the subject reads the material aloud during presentation but does not recall it in the absence of the material.

    b. Reading--verbal recitation. Method in which the subject reads the material aloud during presentation and recalls it orally with prompting in the absence of the material.

    c. Reading--written recitation. Method in which the subject reads the material aloud during presentation and recalls it by writing with prompting in the absence of the material.

    d. Reading--verbal and written recitation. Method in which the subject reads the material aloud during presentation and recalls it orally and by writing with prompting in the absence of the material.

2. Amount of material. Manner in which the material to be learned is divided for practice or repetition. (McGeoch and Irion, 1952, p. 599).

    a. Whole method. Method in which the total amount of material to be learned is repeated from beginning to end during each trial.

    b. Pure parts method. Method in which the total amount of material to be learned is divided into equal parts. Each part is practiced separately. Then, the parts are combined and practiced as a whole.

    c. Progressive parts method. Method in which the total amount of material to be learned is divided into equal parts. The first and second parts are practiced separately and then combined and practiced as a unit. Next, the third part is practiced separately and then combined with the first and second combined parts and practiced as a unit. This progressive addition of parts is continued until the whole is encompassed.

3. Distribution of practice. Manner in which the practice sequences or repetitions are timed (Hovland, 1951, p. 636).

   a. Massed practice. Method in which each trial or repetition is presented successively to the subject with no interpolated time interval.

   b. Distributed practice. Method in which separate trials or blocks of n trials or repetitions are separated by interpolated constant time intervals.

Subjects

Two hundred and eighty-eight subjects from the regular and special classes of the public schools were chosen for six groups, termed major levels groups. Each group consisted of 48 subjects. These major levels groups were established in such a way that selected combinations of MA, CA, and IQ were represented by holding constant and varying these characteristics in several ways. The primary groups, termed MA control groups, were retarded, normal, and superior subjects whose MA's were held constant (between 8 years 6 months and 11 years 6 months) and IQ's and CA's varied. The MA control groups were used as bases for establishing groups, termed CA control groups, whose CA's were held constant and MA's and IQ's varied. These CA control groups were selected in such a way that they contained the following: normal and superior subjects who had CA's within the same range as those of the retarded MA control subjects, and superior subjects who had CA's within the same range as those of the normal MA control subjects. These combinations yielded two sets of groups in which IQ was held constant and MA and CA varied. These included the younger and the older normal groups and the younger, the intermediate aged, and the older superior groups.

No attempt was made to hold the sex frequencies constant by selection.

Six subgroups of subjects, termed base cell groups, were required to correspond to the six combinations formed by the overlap of the amount of material and practice distribution variables. The 48 subjects within each of the six major levels groups were assigned randomly to the six base cells thus forming six base cell subgroups of 8 subjects each within each major levels group. These combined to make 36 base cell subgroups for the entire design.

Administration of the Practice and Task Variables

The subjects in the six major levels groups were administered each of the eight tasks formed by combining the task meaningfulness and recitation type variants. These tasks were administered in conjunction with the six combinations of the amount of material and practice distribution variants. The specific combinations of variants administered to the subjects as they performed the several tasks were determined by the particular base cell group to which they were assigned. In turn, the combination of variants administered to subjects in a base cell group was changed from task to task.

In operation, the tasks were presented to small groups, termed administration groups, which consisted of subjects from several levels groups who were in corresponding base cell groups; that is, who all were scheduled at any one time to be administered a certain task in conjunction with a specific combination of variants.

In addition to instructions germane to the several practice and task variables, subjects were administered directions for speed and accuracy at the beginning of each trial. Also, intermittent reinforcement was used at any time during task administration it was considered to be needed.

Response Measure and Statistical Analyses

The response measure for learning performance was the score, the number of correct responses, on a test in which the stimulus items were presented and the subjects were required to recall and then to write the response items. These were administered at four practice levels--after each 10 trials--in a sequence of 40 trials.

The scores were transformed by a conventional procedure to ensure normality and homogeneity of variance. In situations in which the concern was the practice, task, and sex variables--singly, in combination with each other, or in combination with the levels variable--analyses of covariance were used for generalized comparisons and Kramer's multiple range tests were used, when indicated, for subsequent paired comparisons. When the interest was in the mental age, chronological age, and intelligence variables, a single factor analysis of variance model was employed for the generalized comparisons and _t_-tests were used, when indicated, for subsequent paired comparisons.

The .01 probability level was the criterion for rejecting the null hypothesis in all statistical tests.

Results

The procedures described above for collecting and analyzing data were used to obtain evidence germane to objectives implicit in the purpose of the investigation: to study the effects and interaction effects of selected practice, task, and subject variables on learning performance. Briefly, the results of the data analyses indicated the following. Two practice variables, recitation type and amount of material, each affected learning performance; the third, practice distribution, did not. The task variable, meaningfulness of material, did not affect learning performance. Among the subject variables, mental age affected learning performance; chronological age, intelligence level, and sex did not. Generally, no interactions occurred: differences were present between groups formed by the several combinations of the practice, task, and subject variables; however, there was no evidence that these differences were consistently and systematically heterogenous.

Discussion and Conclusions

The relationships indicated by the data analyses were consistent with results reported by such investigators as Gates (1917), Wylie (1928), Epstein (1950), Davis (1935), Blake (1959), and McGinnis (1929.) They were not consistent with information presented by such investigators as Reed (1924a), Hovland (1949), Cook (1944), Katona (1940), and Pyle (1925). Several factors were suggested as explanatory for relationships indicated relevant to each variable. Among these were the following: recitation type--maintenance of an active attitude, practice of the material in the form it is to be used, and acquisition of knowledge of results; amount of material--relative lengths of wholes and parts, transfer of learning, influence of set, practice of the material in the form it is to be used, presence of retroactive inhibition or differential forgetting, amount of time exposed to the material, and length of time required to connect the parts; practice distribution--opportunity for warm-up, usefulness of response variability, presence of differential fatigue and motivational variations, possibility of intralist interferences and differential forgetting, and possibility for surreptitious practice; task meaningfulness--influence of set, nature of the organizational principle and material, and similarity between logical and non-logical materials; levels--motor facility required for task performance, nature of the testing situation, and activity required to determine the correct response; sex--nature of the task in relation to the interests and the training and experience of the subjects, and motor facility required for task performance.

Concomitant weighing of the major trends evident in the data obtained herein, the applicability of the previous investigations, and certain a priori considerations provided bases for judging certain conclusions to be tenable. These conclusions are listed below. They are organized in terms of the several research objectives which were delimited in Chapter I as following from the purpose of the investigation and which were used in Chapters III and IV as a framework for summarizing and discussing relationships apparent in the basic data.

Effects of the Practice Variables on Learning Performance

Recitation Type

Type of recitation affects learning performance. Subjects who use combined written and verbal recitation perform more adequately than those who use written recitation, verbal recitation, or no recitation. Subjects who use written recitation perform more adequately than those who use verbal recitation or no recitation. Subjects who use verbal recitation perform more adequately than those who use no recitation.

Amount of Material

Amount of material affects learning performance. At early stages of practice, subjects using parts methods perform more adequately than those using the whole method; at later stages of practice, subjects using the whole method perform more adequately. Subjects using pure and progressive parts methods perform with similar adequacy at all practice levels.

Practice Distribution

Distribution of practice does not affect learning performance. Subjects using massed and distributed practice perform with similar adequacy.

Effect of the Task Variable on Learning Performance

Meaningfulness of task materials do not affect learning performance. Subjects using logically related material and those using non-logically related material perform with similar adequacy.

Effects of the Subject Variables on Learning Performance

Levels

Mental age affects learning performance; chronological age and intelligence level do not. When mental age is equivalent and chronological age and intelligence level vary, retarded, normal, and superior subjects perform with similar adequacy. When chronological age is equivalent and mental age and intelligence level vary, retarded subjects perform less adequately than normal subjects, and both groups perform less adequately than superior subjects. When intelligence level is equivalent and mental age and chronological age vary, younger subjects perform less adequately than subjects of an intermediate age, and both groups perform less adequately than still older subjects.

Sex

Sex does not affect learning performance. Males and females perform with similar adequacy.

Interaction Effects of the Practice Variables on Learning Performance

Recitation Type X Amount of Material

Type of recitation and amount of material do not interact to affect learning performance. No consistently heterogeneous differences occur in the performance of subjects who use the several combinations of the following: written and verbal recitation, written recitation, verbal recitation, and no recitation and the whole method, the pure parts method, and the progressive parts method.

Recitation Type X Practice Distribution

Type of recitation and distribution of practice do not interact to affect learning performance. No consistently heterogeneous differences occur in the performance of subjects who use the several combinations of the following: written and verbal recitation, written recitation, verbal recitation, and no recitation and massed practice and distributed practice.

Amount of Material X Practice Distribution

Amount of material and distribution of practice do not interact to affect learning performance. No consistently heterogeneous differences occur in the performance of subjects who use the several combinations of the following: the whole method, the pure parts method, and the progressive parts method and massed practice and distributed practice.

Interaction Effect of the Subject Variables on Learning Performance

Levels and sex do not interact to affect learning performance. No consistently heterogeneous differences occur in the performance of the following: subjects in the categories formed by the several combinations of sex and levels.

Interaction Effects of the Practice and Task Variables on Learning Performance

Recitation Type X Task Meanginfulness

Type of recitation and meaningfulness of task materials do not tend to interact to affect learning performance. No consistently heterogeneous differences occur in the performance of subjects who use the several combinations of the following: reading with no recitation, verbal recitation, written recitation, and combined written and verbal recitation in combination with logically related material and non-logically related material.

Amount of Material X Task Meaningfulness

Amount of material and meaningfulness of task materials do not interact to affect learning performance. No consistently heterogeneous differences occur in the performance of subjects who use the several combinations of the following: the whole method, the pure parts method, and the progressive parts method and logically related materials and non-logically related material.

Practice Distribution X Task Meaningfulness

Distribution of practice and meaningfulness of task materials do not interact to affect learning performance. No consistently heterogeneous differences occur in the performance of subjects who use the several combinations of the following: logically related material and non-logically related material and massed practice and distributed practice.

Interaction Effects of the Practice and Subject Variables on Learning Performance

Recitation Type X Levels

Type of recitation and levels do not interact to affect learning performance. No consistently heterogeneous differences occur in the performance of the following: subjects within the several levels groups who use combined written and verbal recitation, written recitation, verbal recitation, and no recitation.

Amount of Material X Levels

Amount of material and levels do not interact to affect learning performance. No consistently heterogeneous differences occur in the performance of the following: subjects within the several levels groups who use the whole method, the pure parts method, and the progressive parts method.

Practice Distribution X Levels

Distribution of practice and levels do not interact to affect learning performance. No consistently heterogeneous differences occur in the performance of the following: subjects within the various levels groups who use massed and distributed practice.

Recitation Type X Amount of Material X Levels

Type of recitation, amount of material, and levels do not interact to affect learning performance. No consistently heterogeneous differences occur in the performance of the following: subjects within the various levels groups who use the several combinations of written and verbal recitation, written recitation, verbal recitation and no recitation and the whole method, the pure parts method and the progressive parts method.

Recitation Type X Practice Distribution X Levels

Type of recitation, distribution of practice, and levels do not interact to affect learning performance. No consistently heterogeneous differences occur in the performance of the following: subjects within the various levels groups who use the several combinations of written and verbal recitation, written recitation, verbal recitation and no recitation and massed practice and distributed practice.

Amount of Material X Practice Distribution X Levels

Amount of material, practice distribution, and levels do not interact to affect learning performance. No consistently heterogeneous differences occur in the performance of the following: subjects within the various levels groups who use the several combinations of the whole method, pure parts method, and progressive parts method and massed practice and distributed practice.

Interaction Effect of the Task and Subject Variables on Learning Performance

Task Meaningfulness X Levels

Meaningfulness of task materials and levels do not interact to affect learning performance. No consistently heterogeneous differences occur in the performance of subjects within the various levels groups who use logically related materials and non-logically related materials.

Interaction Effect of the Practice, Task, and Subject Variables on Learning Performance

Recitation Type X Task Meaningfulness X Levels

Type of recitation, meaningfulness of task materials, and levels do not interact to affect learning performance. No consistently heterogeneous differences occur in the performance of the following: subjects within the various levels groups who use the several combinations of logically related material and non-logically related material and written and verbal recitation, written recitation, verbal recitation, and no recitation.

Amount of Material X Task Meaningfulness X Levels

Amount of material, meaningfulness of task materials, and levels do not interact to affect learning performance. No consistently heterogeneous differences occur in the performance of the following: subjects within the various levels groups who use the several combinations of logically related materials and non-logically related materials and the whole method, the pure parts method, and the progressive parts method.

Practice Distribution X Task Meaningfulness X Levels

Distribution of practice, meaningfulness of task materials, and levels do not interact to affect learning performance. No consistently heterogeneous differences occur in the performance of the following: subjects within the various levels groups who use the several combinations of logically related materials and non-logically related materials and massed practice and distributed practice.

Limitations

The following restrictions on generalization from the results obtained herein are noted and stressed. All conclusions are limited to the conditions involved in this investigation: i.e., to populations similar to those from which the subjects were selected; to practice variables, task variables, and procedures similar to those employed; and to response measures and aspects of behavior similar to those examined. Wider generalization is contingent upon further research. Also pertinent are comments by Johnson and Blake (1960) about the applicability of information such as that accrued herein to children's behavior in the classroom.

Finally, it must be realized that the investigations conducted herein and proposed are primarily theoretical in nature. For

> purposes of experimental control, it was necessary that the task materials, and the manner in which they were manipulated, be (types with which the subjects had had no) specific prior experience, and that certain related and highly important variables be regulated as much as possible. In addition, the circumstances related to the task administration cannot be considered to reflect the circumstances existing in a classroom. That is to say, the dynamics operating in the research situation and those operating in a classroom situation probably are not comparable directly. As a result, the generalizations emanating from investigations such as these are not applicable directly to academic learning within the classroom. Rather, they should be considered as basic data which should be extended or evaluated further in a parallel series of investigations in which tasks and experimental conditions (are) more representative of the average classroom situation (p. 153).

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APPENDICES

PRECEDING PAGE BLANK-NOT FILMED

APPENDIX A

COOPERATING PUBLIC SCHOOL PERSONNEL

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Athens High School

Principal: Mr. Guy Driver; Assistant Principal: Mr. Daniel New; Secretary: Mrs. Charles Parham; Counselor: Mrs.Laura P. Marbut; Teachers: Miss Mary L. Bradford, Mr. Francis W. Malinowski, Mrs. Irene L. Tidwell, Mrs. Barbara Tooke, Mrs. India Wilson, Mrs. Myrtis Quinnelly; Millitary Department: Capt. Charles R. White, Sgt. Rufus A. Bradley, Sgt. Roger Holman, Sgt. O. R. Strickland.

Clarke County Junior High School

Principal: Mr. A. Q. Hagan; Assistant Principal: Mr. Dan H. Burke; Counselor, Mrs. Florence L. Rambo; Secretary: Mrs. Ruth Denman; Teachers: Mrs. Janet Balcom, Miss Ann Brinkley, Miss Catherine Byrd, Miss Lucy Clark, Mr. Bill Dawson, Miss Joan Donaldson, Mr. Johnny Demos, Mrs. Margaret S. Dunson, Mrs. Estelle Farmer, Mr. Joe Grant, Mr. Hugh Hale, Mrs. Estelle Hendricks, Mrs. Sydney Jones, Mrs. Cora Belle Kirk, Mrs. Louisa W. Lee, Mrs. Blanche Lumley, Mrs. Mildred S. Martin, Mrs. Lily Mauldin, Mrs. Legene Mullis, Miss Annie Obenshain, Mrs. Alice Panter, Mr. Glenn Patterson, Mrs. Claire L. Rutherford, Mrs. Adelaide Swindell, Mrs. TeCoah Tucker, Mrs. Sue Warren, Mrs. Mae M. Whatley, Mrs. Helen Wilenchek.

Alps Road School

Principal: Miss Helen Treanor; Teachers: Mrs. Cornelia D. Carmichael, Mrs. Flora B. Faircloth, Mrs. Virginia H. O'Kelley, Mrs. Virginia Percifield, Mrs. Louise D. Plant, Mrs. Sherry Spadafino, Mrs. Reggie Vipperman, Mrs. Margaret Hiers.

David C. Barrow School

Principal: Mrs. Rosa P. Tarpley; Teachers: Mrs. Dorothy I. Booth, Mrs. Margaret S. Callahan, Miss Thelma Elliott, Mrs. Margaret Harris, Mrs. Mary W. Osborne, Mrs. Elaine Saul, Mrs. Ruth Simons, Miss LaVerne Smith, Miss Ann E. Tabor.

Chase Street School

Principal: Mrs. Hampton Rowland; Teachers: Mrs. Marjorie Brightwell, Mrs. Amber Dickerson, Miss Helen Doster, Miss Frances Goodwin, Mrs. Maud L. Huston, Miss Vada Kent, Mrs. Nancy LaBoon, Mrs. Editha Mills, Mrs. Mary Jo Nix, Mrs. Jacqueline Puffingberger, Mrs. Mozelle E. Smith, Mrs. Lily L. Tabor, Mrs. Annette Zuber.

College Avenue School

Principal: Miss Magdalene Glenn; Teachers: Mrs. Ruth Arnold, Mrs. Mary B. Ballew, Mrs. Hazel R. Davis, Miss Dorothy Firor, Mrs. Janice Griffeth, Miss. Mildred Johnson, Mrs. Virginia W. Lawrence, Mrs. Woodie T. Lipthratt, Mrs. Agnes Orr, Mrs. Sara McN. Presnell.

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APPENDIX B

SUBJECTS LISTED BY BASE CELLS:

SCHOOL, MENTAL AGE, INTELLIGENCE QUOTIENT, AND SEX

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Retarded Group

	Subject Code No.	School Code No.	MA (Mos.)	CA (Mos.)	IQ	Sex
Base cell one	B1-018	5	108	159	068	M
	B1-024	5	116	158	074	M
	B1-010	5	124	177	073	M
	B1-023	5	127	175	075	M
	B1-034	5	130	161	082	F
	B1-007	2	120	183	069	M
	B1-042	5	124	157	079	F
	B1-003	6	105	156	068	M
Base cell two	B1-037	5	124	174	074	F
	B1-014	6	107	165	066	M
	B1-011	5	120	172	072	F
	B1-012	5	141	180	082	M
	B1-044	5	140	177	082	F
	B1-043	5	122	164	076	F
	B1-033	5	120	158	076	F
	B1-027	5	126	160	079	M
Base cell three	B1-006	5	128	191	072	M
	B1-001	2	135	190	075	M
	B1-005	5	127	186	072	M
	B1-026	5	117	169	071	M
	B1-022	5	096	185	055	F
	B1-028	5	131	171	079	M
	B1-045	2	135	174	080	F
	B1-035	5	126	171	076	M

Retarded Group (continued)

	Subject Code No.	School Code No.	MA (Mos.)	CA (Mos.)	IQ	Sex
Base cell four	B1-020	5	105	173	063	F
	B1-048	5	117	146	080	F
	B1-009	5	122	173	073	M
	B1-021	2	132	200	073	M
	B1-019	5	125	186	071	F
	B1-047	5	120	179	070	F
	B1-031	6	109	148	074	M
	B1-008	5	115	150	077	M
Base cell five	B1-030	5	127	161	080	F
	B1-017	5	130	169	079	F
	B1-038	5	112	178	065	F
	B1-041	2	091	194	051	M
	B1-036	2	142	193	079	M
	B1-040	5	118	170	072	M
	B1-016	5	123	186	070	F
	B1-004	5	123	183	071	F
Base cell six	B1-002	5	127	198	071	M
	B1-039	2	130	188	073	F
	B1-029	5	143	184	082	M
	B1-032	5	121	174	072	M
	B1-015	5	125	180	073	M
	B1-025	5	120	160	075	M
	B1-013	5	126	159	080	M
	B1-046	2	136	189	076	M

Younger Normal Group

	Subject Code No.	School Code No.	MA (Mos.)	CA (Mos.)	IQ	Sex
Base cell one	B2-007	3	106	097	109	M
	B2-017	6	136	132	103	M
	B2-027	3	109	101	108	M
	B2-039	6	111	109	102	M
	B2-036	3	102	112	091	F
	B2-040	6	118	116	102	F
	B2-009	1	116	126	092	F
	B2-003	1	132	118	111	F
Base cell two	B2-030	6	109	119	092	F
	B2-037	3	106	107	099	F
	B2-013	6	120	124	097	M
	B2-015	6	120	124	100	F
	B2-048	1	114	111	103	F
	B2-020	1	136	124	110	M
	B2-026	6	120	122	098	F
	B2-038	1	118	112	105	M
Base cell three	B2-035	4	102	109	094	F
	B2-025	1	134	130	103	M
	B2-045	1	126	119	106	M
	B2-004	1	115	104	111	M
	B2-023	3	105	096	109	F
	B2-042	1	118	115	103	M
	B2-028	3	100	108	093	F
	B2-031	4	111	113	098	F

Younger Normal Group (continued)

	Subject Code No.	School Code No.	MA (Mos.)	CA (Mos.)	IQ	Sex
Base cell four	B2-008	6	120	115	104	F
	B2-033	4	117	113	104	F
	B2-029	3	123	116	106	M
	B2-014	6	116	132	088	M
	B2-032	3	107	105	102	F
	B2-018	6	129	127	102	M
	B2-022	6	121	125	097	F
	B2-024	4	101	109	093	M
Base cell five	B2-012	3	112	106	106	F
	B2-005	6	102	110	093	F
	B2-019	6	121	110	110	F
	B2-010	6	110	108	102	M
	B2-006	4	120	120	100	M
	B2-001	1	105	116	091	F
	B2-016	6	117	126	093	M
	B2-021	3	140	126	111	F
Base cell six	B2-043	3	134	121	111	F
	B2-041	6	117	115	102	F
	B2-047	1	114	114	100	M
	B2-044	4	110	116	095	F
	B2-034	3	108	098	110	M
	B2-011	3	102	102	100	F
	B2-002	4	111	101	110	F
	B2-046	6	122	120	102	M

Youngest Superior Group

	Subject Code No.	School Code No.	MA (Mos.)	CA (Mos.)	IQ	Sex
Base cell one	B3-036	1	138	103	134	F
	B3-002	4	135	105	129	M
	B3-019	3	140	099	141	M
	B3-006	1	126	093	136	F
	B3-044	3	116	088	133	F
	B3-025	1	127	092	138	F
	B3-035	4	110	085	129	M
	B3-004	4	107	088	122	M
Base cell two	B3-047	4	128	103	124	M
	B3-024	1	129	098	132	M
	B3-018	1	124	100	124	F
	B3-003	3	120	094	128	F
	B3-020	1	133	108	123	F
	B3-023	1	115	090	128	F
	B3-007	1	119	092	129	M
	B3-001	1	142	120	118	M
Base cell three	B3-029	1	139	107	130	M
	B3-043	4	121	102	119	F
	B3-040	4	121	099	122	M
	B3-041	3	121	099	122	M
	B3-039	1	123	088	140	F
	B3-033	3	136	109	125	M
	B3-008	1	133	095	140	F
	B3-015	1	126	102	124	M

Youngest Superior Group (continued)

	Subject Code No.	School Code No.	MA (Mos.)	CA (Mos.)	IQ	Sex
Base cell four	B3-048	3	139	090	155	F
	B3-026	1	112	091	123	M
	B3-014	3	132	101	131	F
	B3-017	4	108	087	124	F
	B3-022	3	137	091	151	M
	B3-016	1	114	095	120	F
	B3-005	4	130	102	127	M
	B3-030	4	141	112	125	M
Base cell five	B3-045	6	141	111	127	F
	B3-031	1	141	108	130	F
	B3-034	1	127	092	138	M
	B3-038	4	107	087	123	F
	B3-009	4	128	096	133	M
	B3-028	4	110	088	125	F
	B3-032	4	126	101	125	M
	B3-010	4	120	090	133	M
Base cell six	B3-021	4	109	092	119	F
	B3-011	4	130	090	144	F
	B3-042	4	108	087	124	M
	B3-027	1	135	100	135	F
	B3-013	3	131	097	135	M
	B3-046	1	151	123	122	F
	B3-012	3	126	107	118	M
	B3-037	1	136	102	133	F

Intermediate Superior Group

	Subject Code No.	School Code No.	MA (Mos.)	CA (Mos.)	IQ	Sex
Base cell one	B4-038	4		133	125	F
	B4-045	4		127	122	F
	B4-004	4		100	122	M
	B4-013	4		112	134	F
	B4-041	4		128	130	F
	B4-018	4		136	124	M
	B4-022	4		138	133	F
	B4-003	4		122	160	F
Base cell two	B4-002	4		107	125	F
	B4-014	4		109	130	M
	B4-042	4		122	126	F
	B4-020	4		100	138	M
	B4-017	4		131	125	M
	B4-016	4		102	129	M
	B4-021	4		127	128	F
	B4-035	4		133	133	F
Base cell three	B4-048	4		101	135	F
	B4-043	4		117	121	F
	B4-012	4		101	128	F
	B4-007	4		127	125	F
	B4-086	4		122	136	M
	B4-037	4		118	124	F
	B4-006	4		125	158	F
	B4-034	4		110	134	M

Intermediate Superior Group (continued)

	Subject Code No.	School Code No.	MA (Mos.)	CA (Mos.)	IQ	Sex
Base cell four	B4-025	4		132	153	F
	B4-046	4		112	139	M
	B4-029	4		120	128	M
	B4-040	4		125	123	F
	B4-005	4		112	123	F
	B4-047	4		113	125	M
	B4-027	4		121	129	M
	B4-024	4		132	134	F
Base cell five	B4-033	4		108	146	M
	B4-019	4		136	124	M
	B4-011	4		113	135	M
	B4-028	4		127	148	M
	B4-010	4		110	133	M
	B4-039	4		123	127	M
	B4-030	4		135	123	M
	B4-023	4		123	125	M
Base cell six	B4-032	4		108	123	M
	B4-031	6		126	121	F
	B4-026	4		095	126	F
	B4-044	4		122	125	F
	B4-009	4		108	128	F
	B4-001	4		127	123	F
	B4-008	4		108	147	F
	B4-015	4		125	125	M

Older Normal Group

	Subject Code No.	School Code No.	MA (Mos.)	CA (Mos.)	IQ	Sex
Base cell one	B5-017	2		173	106	F
	B5-013	2		197	109	F
	B5-023	5		144	106	M
	B5-030	2		203	109	F
	B5-002	5		150	096	M
	B5-025	2		180	105	F
	B5-004	2		174	102	M
	B5-033	2		177	105	F
Base cell two	B5-026	2		199	108	F
	B5-043	5		175	101	M
	B5-009	2		173	098	F
	B5-032	5		178	110	M
	B5-039	2		177	099	F
	B5-008	5		180	107	M
	B5-041	2		191	106	M
	B5-005	2		200	094	M
Base cell three	B5-012	5		163	110	M
	B5-042	5		152	107	F
	B5-014	5		160	102	M
	B5-018	5		156	109	M
	B5-029	2		182	095	M
	B5-048	5		159	104	M
	B5-037	5		159	094	F
	B5-044	2		180	100	F

Older Normal Group (continued)

	Subject Code No.	School Code No.	MA (Mos.)	CA (Mos.)	IQ	Sex
Base cell four	B5-001	2		199	104	F
	B5-010	5		172	092	M
	B5-036	2		169	109	F
	B5-046	2		170	098	M
	B5-003	2		193	101	M
	B5-007	3		159	099	M
	B5-020	2		186	103	F
	B5-045	2		186	100	F
Base cell five	B5-047	2		184	106	F
	B5-006	2		185	107	M
	B5-011	5		150	105	F
	B5-031	2		171	097	F
	B5-015	2		171	090	F
	B5-024	2		193	104	M
	B5-040	2		197	102	M
	B5-034	5		140	106	F
Base cell six	B5-021	2		194	101	F
	B5-035	2		178	099	M
	B5-016	2		184	098	M
	B5-019	2		187	093	F
	B5-027	2		186	093	F
	B5-028	2		180	102	F
	B5-022	2		184	101	F
	B5-030	2		173	110	M

Oldest Superior Group

	Subject Code No.	School Code No.	MA (Mos.)	CA (Mos.)	IQ	Sex
Base cell one	B6-022	2		172	123	M
	B6-028	2		173	120	M
	B6-006	2		169	123	M
	B6-012	2		170	130	F
	B6-046	2		173	129	F
	B6-007	2		179	129	F
	B6-005	2		169	124	M
	B6-004	2		170	126	M
Base cell two	B6-036	5		160	124	M
	B6-016	5		151	132	F
	B6-014	5		161	123	M
	B6-026	5		162	130	M
	B6-044	5		159	132	M
	B6-043	5		164	129	F
	B6-033	5		165	133	F
	B6-011	2		107	121	M
Base cell three	B6-008	2		169	139	M
	B6-018	5		153	137	F
	B6-001	2		171	122	M
	B6-023	5		171	130	M
	B6-041	5		160	137	M
	B6-034	2		174	131	F
	B6-035	2		171	122	F
	B6-009	5		150	126	M

Oldest Superior Group (continued)

	Subject Code No.	School Code No.	MA (Mos.)	CA (Mos.)	IQ	Sex
Base cell four	B6-010	2		174	129	M
	B6-020	2		172	126	F
	B6-040	2		176	130	F
	B6-028	2		179	119	F
	B6-019	2		178	124	M
	B6-047	2		180	129	M
	B6-027	2		179	133	F
	B6-003	2		170	121	M
Base cell five	B6-030	2		176	122	M
	B6-002	2		199	129	F
	B6-017	2		170	124	M
	B6-021	2		174	129	M
	B6-015	2		196	123	F
	B6-029	2		175	131	F
	B6-038	2		191	124	F
	B6-043	2		202	121	F
Base cell six	B6-031	5		140	136	F
	B6-024	5		146	136	M
	B6-039	2		196	134	F
	B6-042	2		190	121	F
	B6-037	2		184	121	M
	B6-013	2		200	136	M
	B6-032	2		172	125	M
	B6-04[illegible]	2		190	126	F

APPENDIX C

TASK MATERIALS

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Logical I

Trial 1 (Reading)

Whole		Pure Part		Progressive Part	
nop	487	nop	487	nop	487
hib	739	hib	739	hib	739
bas	293	bas	293	bas	293
hev	734				
bic	291				
mur	485				
boz	298				
nem	482				
haj	736				

Trial 2 (Reading)

Whole		Pure Part		Progressive Part	
hib	739	hib	739	hib	739
bas	293	bas	293	bas	293
nop	487	nop	487	nop	487
bic	291				
mur	485				
hev	734				
nem	482				
haj	736				
boz	298				

Trial 3 (Reading)

Whole		Pure Part		Progressive Part	
bas	293	bas	293	bas	293
nop	487	nop	487	nop	487
hib	739	hib	739	hib	739
mur	485				
hev	734				
bic	291				
haj	736				
boz	298				
nem	482				

Trial 4 (Reading)

Whole		Pure Part		Progressive Part	
nop	487	nop	487	nop	487
hib	739	hib	739	hib	739
bas	293	bas	293	bas	293
hev	734				
bic	291				
mur	485				
boz	298				
nem	482				
haj	736				

Trial 5 (Reading)

Whole		Pure Part		Progressive Part	
hib	739	hib	739	hib	739
bas	293	bas	293	bas	293
nop	487	nop	487	nop	487
bic	291				
mur	485				
hev	734				
nem	482				
haj	736				
boz	298				

Trial 6 (Reading)

Whole		Pure Part		Progressive Part	
nop	487	nop	487	nop	487
hib	739	hib	739	hib	739
bas	293	bas	293	bas	293
hev	734				
bic	291				
mur	485				
boz	298				
nem	482				
haj	736				

Trial 7 (Reading)

Whole		**Pure Part**		**Progressive Part**	
nop	487	nop	487	nop	487
bas	293	bas	293	bas	293
hib	739	hib	739	hib	739
hev	734				
nur	485				
bic	291				
boz	298				
haj	736				
nem	482				

Trial 8 (Reading)

Whole		**Pure Part**		**Progressive Part**	
bas	293	bas	293	bas	293
hib	739	hib	739	hib	739
nop	487	nop	487	nop	487
nur	485				
bic	291				
hev	734				
haj	736				
nem	482				
boz	298				

Trial 9 (Reading)

Whole		**Pure Part**		**Progressive Part**	
hib	739	hib	739	hib	739
nop	487	nop	487	nop	487
bas	293	bas	293	bas	293
bic	291				
hev	734				
nur	485				
nem	482				
boz	298				
haj	736				

Trial 10 (Reading)

Whole		Pure Part		Progressive Part	
nop	487	nop	487	nop	487
bas	293	bas	293	bas	293
hib	739	hib	739	hib	739
hev	734				
nur	485				
bic	291				
boz	298				
haj	736				
nem	482				

Test List

Whole		Pure Part		Progressive Part	
bas	______	bas	______	bas	______
hib	______	hib	______	hib	______
nop	______	nop	______	nop	______
nur	______				
bic	______				
hev	______				
haj	______				
nem	______				
boz	______				

Trial 11 (Reading)

Whole		Pure Part		Progressive Part	
nop	487				
hib	739				
bas	293				
hev	734	hev	734	hev	734
bic	291	bic	291	bic	291
nur	485	nur	485	nur	485
boz	298				
nem	482				
haj	736				

Trial 12 (Reading)

Whole		Pure Part		Progressive Part	
hib	739				
bas	293				
nop	487				
bic	291	bic	291	bic	291
nur	485	nur	485	nur	485
hev	734	hev	734	hev	734
nem	482				
haj	736				
boz	298				

Trial 13 (Reading)

Whole		Pure Part		Progressive Part	
bas	293				
nop	487				
hib	739				
nur	485	nur	485	nur	485
hev	734	hev	734	hev	734
bic	291	bic	291	bic	291
haj	736				
boz	298				
nem	482				

Trial 14 (Reading)

Whole		Pure Part		Progressive Part	
nop	487				
hib	739				
bas	293				
hev	734	hev	734	hev	734
bic	291	bic	291	bic	291
nur	485	nur	485	nur	485
boz	298				
nem	482				
haj	736				

Trial 15 (Reading)

Whole		Pure Part		Progressive Part	
hib	739				
bas	293				
nop	487				
bic	291	bic	291	bic	291
nur	485	nur	485	nur	485
hev	734	hev	734	hev	734
nem	482				
haj	736				
boz	298				

Trial 16 (Reading)

Whole		Pure Part		Progressive Part	
nop	487				
hib	739				
bas	293				
hev	734	hev	734	hev	734
bic	291	bic	291	bic	291
nur	485	nur	485	nur	485
boz	298				
nem	482				
haj	736				

Trial 17 (Reading)

Whole		Pure Part		Progressive Part	
nop	487				
bas	293				
hib	739				
hev	734	hev	734	hev	734
nur	485	nur	485	nur	485
bic	291	bic	291	bic	291
boz	298				
haj	736				
nem	482				

Trial 18 (Reading)

Whole		**Pure Part**		**Progressive Part**	
bas	293				
hib	739				
nop	487				
nur	485	nur	485	nur	485
bic	291	bic	291	bic	291
hev	734	hev	734	hev	734
haj	736				
nem	482				
boz	298				

Trial 19 (Reading)

Whole		**Pure Part**		**Progressive Part**	
hib	739				
nop	487				
bas	293				
bic	291	bic	291	bic	291
hev	734	hev	734	hev	734
nur	485	nur	485	nur	485
nem	482				
boz	298				
haj	736				

Trial 20 (Reading)

Whole		**Pure Part**		**Progressive Part**	
nop	487				
bas	293				
hib	739				
hev	734	hev	734	hev	734
nur	485	nur	485	nur	485
bic	291	bic	291	bic	291
boz	298				
haj	736				
nem	482				

Test List

Whole	Pure Part	Progressive Part
bas ______		
hib ______		
nop ______		
nur ______	nur ______	nur ______
bic ______	bic ______	bic ______
hev ______	hev ______	hev ______
haj ______		
nem ______		
boz ______		

Trial 21 (Reading)

Whole		Pure Part		Progressive Part	
nop	487			nop	487
hib	739			hib	739
bas	293			bas	293
hev	734			hev	734
bic	291			bic	291
nur	485			nur	485
boz	298	boz	298		
nem	482	nem	482		
haj	736	haj	736		

Trial 22 (Reading)

Whole		Pure Part		Progressive Part	
hib	739			hib	739
bas	293			bas	293
nop	487			nop	487
bic	291			bic	291
nur	485			nur	485
hev	734			hev	734
nem	482	nem	482		
haj	736	haj	736		
boz	298	boz	298		

Trial 23 (Reading)

Whole		Pure Part		Progressive Part	
bas	293			bas	293
nop	487			nop	487
hib	739			hib	739
nur	485			nur	485
hev	734			hev	734
bic	291			bic	291
haj	736	haj	736		
boz	298	boz	298		
nom	482	nom	482		

Trial 24 (Reading)

Whole		Pure Part		Progressive Part	
nop	487			nop	487
hib	739			hib	739
bas	293			bas	293
hev	734			hev	734
bic	291			bic	291
nur	485			nur	485
boz	298	boz	298		
nom	482	nom	482		
haj	736	haj	736		

Trial 25 (Reading)

Whole		Pure Part		Progressive Part	
hib	739			hib	739
bas	293			bas	293
nop	487			nop	487
bic	291			bic	291
nur	485			nur	485
hev	734			hev	734
nom	482	nom	482		
haj	736	haj	736		
boz	298	boz	298		

Trial 26 (Reading)

Whole		Pure Part		Progressive Part	
nop	487				
hib	739				
bas	293				
hev	734				
bic	291				
mur	485				
boz	298	boz	298	boz	298
nem	482	nem	482	nem	482
haj	736	haj	736	haj	736

Trial 27 (Reading)

Whole		Pure Part		Progressive Part	
nop	487				
bas	293				
hib	739				
hev	734				
mur	485				
bic	291				
boz	298	boz	298	nem	482
haj	736	haj	736	haj	736
nem	482	nem	482	boz	298

Trial 28 (Reading)

Whole		Pure Part		Progressive Part	
bas	293				
hib	739				
nop	487				
mur	485				
bic	291				
hev	734				
haj	736	haj	736	haj	736
nem	482	nem	482	boz	298
boz	298	boz	298	nem	482

Trial 29 (Reading)

Whole		Pure Part		Progressive Part	
hib	739				
nop	407				
bas	293				
bic	291				
hev	734				
mur	485				
nem	402	nem	402	boz	298
boz	290	boz	290	nem	402
haj	736	haj	736	haj	736

Trial 30 (Reading)

Whole		Pure Part		Progressive Part	
nop	407				
bas	293				
hib	739				
hev	734				
mur	485				
bic	291				
boz	290	boz	290	nem	402
haj	736	haj	736	haj	736
nem	402	nem	402	boz	298

Test List

Whole		Pure Part		Progressive Part	
bas	______				
hib	______				
nop	______				
mur	______				
bic	______				
hev	______				
haj	______	haj	______	haj	______
nem	______	nem	______	nem	______
boz	______	boz	______	boz	______

Trial 31 (Reading)

Whole		Pure Part		Progressive Part	
nop	407	nop	407		
hib	739	hib	739		
bas	293	bas	293		
hev	734	hev	734		
bic	291	bic	291		
mur	405	mur	405		
boz	298	boz	298	boz	298
nem	402	nem	402	nem	402
haj	736	haj	736	haj	736

Trial 32 (Reading)

Whole		Pure Part		Progressive Part	
hib	739	hib	739		
bas	293	bas	293		
nop	407	nop	407		
bic	291	bic	291		
mur	405	mur	405		
hev	734	hev	734		
nem	402	nem	402	boz	298
haj	736	haj	736	haj	736
boz	298	boz	298	nem	402

Trial 33 (Reading)

Whole		Pure Part		Progressive Part	
bas	293	bas	293	______	
nop	407	nop	407	______	
hib	739	hib	739	______	
mur	405	mur	405	______	
hev	734	hev	734	______	
bic	291	bic	291	______	
haj	736	haj	736	haj	736
boz	298	boz	298	nem	402
nem	402	nem	402	boz	298

Trial 34 (Reading)

Whole		Pure Part		Progressive Part	
nop	407	nop	407		
hib	739	hib	739		
bas	293	bas	293		
hev	734	hev	734		
bic	291	bic	291		
nur	405	nur	405		
boz	290	boz	290	nem	402
nem	402	nem	402	boz	290
haj	736	haj	736	haj	736

Trial 35 (Reading)

Whole		Pure Part		Progressive Part	
hib	739	hib	739		
bas	293	bas	293		
nop	407	nop	407		
bic	291	bic	291		
nur	405	nur	405		
hev	734	hev	734		
nem	402	nem	402	haj	736
haj	736	haj	736	nem	402
boz	290	boz	290	boz	290

Trial 36 (Reading)

Whole		Pure Part		Progressive Part	
nop	407	nop	407	nop	407
hib	739	hib	739	hib	739
bas	293	bas	293	bas	293
hev	734	hev	734	hev	734
bic	291	bic	291	bic	291
nur	405	nur	405	nur	405
boz	290	boz	290	boz	290
nem	402	nem	402	nem	402
haj	736	haj	736	haj	736

Trial 37 (Reading)

Whole		Pure Part		Progressive Part	
nop	407	nop	407	nop	407
bas	293	bas	293	bas	293
hib	739	hib	739	hib	739
hev	734	hev	734	hev	734
mur	405	mur	405	mur	405
bic	291	bic	291	bic	291
boz	290	boz	290	boz	290
haj	736	haj	736	haj	736
nem	402	nem	402	nem	402

Trial 38 (Reading)

Whole		Pure Part		Progressive Part	
bas	293	bas	293	bas	293
hib	739	hib	739	hib	739
nop	407	nop	407	nop	407
mur	405	mur	405	mur	405
bic	291	bic	291	bic	291
hev	734	hev	734	hev	734
haj	736	haj	736	haj	736
nem	402	nem	402	nem	402
boz	290	boz	290	boz	290

Trial 39 (Reading)

Whole		Pure Part		Progressive Part	
hib	739	hib	739	hib	739
nop	407	nop	407	nop	407
bas	293	bas	293	bas	293
bic	291	bic	291	bic	291
hev	734	hev	734	hev	734
mur	405	mur	405	mur	405
nem	402	nem	402	nem	402
boz	290	boz	290	boz	290
haj	736	haj	736	haj	736

Trial 40 (Reading)

Whole		Pure Part		Progressive Part	
nop	407	nop	407	nop	407
bas	293	bas	293	bas	293
hib	739	hib	739	hib	739
hev	734	hev	734	hev	734
mur	405	mur	405	mur	405
bic	291	bic	291	bic	291
bos	290	bos	290	bos	290
haj	736	haj	736	haj	736
nom	402	nom	402	nom	402

Test List

Whole	Pure Part	Progressive Part
bas ______	bas ______	bas ______
hib ______	hib ______	hib ______
nop ______	nop ______	nop ______
mur ______	mur ______	mur ______
bic ______	bic ______	bic ______
hev ______	hev ______	hev ______
haj ______	haj ______	haj ______
nom ______	nom ______	nom ______
bos ______	bos ______	bos ______

Logical II

Trial 1 (Reading)

Whole	Pure Part	Progressive Part
vot 057	vot 057	vot 057
lup 173	lup 173	lup 173
fij 591	fij 591	fij 591
leq 175		
fod 590		
vac 052		
fub 596		
vef 034		
lar 179		

Trial 2 (Recitation)

Whole	Pure Part	Progressive Part
lup ______	lup ______	lup ______
fij ______	fij ______	fij ______
vot ______	vot ______	vot ______
fod ______		
vac ______		
leq ______		
vef ______		
lar ______		
fub ______		

Trial 3 (Recitation)

Whole	Pure Part	Progressive Part
fij ______	fij ______	fij ______
vot ______	vot ______	vot ______
lup ______	lup ______	lup ______
vac ______		
leq ______		
fod ______		
lar ______		
fub ______		
vef ______		

Trial 4 (Recitation)

Whole	Pure Part	Progressive Part
vot ______	vot ______	vot ______
lup ______	lup ______	lup ______
fij ______	fij ______	fij ______
leq ______		
fod ______		
vac ______		
fub ______		
vef ______		
lar ______		

Trial 5 (Recitation)

Whole	Pure Part	Progressive Part
lup ______	lup ______	lup ______
fij ______	fij ______	fij ______
vot ______	vot ______	vot ______
fod ______		
vac ______		
leq ______		
vaf ______		
lar ______		
fub ______		

Trial 6 (Reading)

Whole	Pure Part	Progressive Part
vot 057	vot 057	vot 057
lup 173	lup 173	lup 173
fij 591	fij 591	fij 591
leq 175		
fod 598		
vac 052		
fub 596		
vef 054		
lar 179		

Trial 7 (Recitation)

Whole	Pure Part	Progressive Part
vot ______	vot ______	vot ______
fij ______	fij ______	fij ______
lup ______	lup ______	lup ______
leq ______		
vac ______		
fod ______		
fub ______		
lar ______		
vef ______		

Trial 8 (Recitation)

Whole	Pure Part	Progressive Part
fij ______	fij ______	fij ______
lup ______	lup ______	lup ______
vot ______	vot ______	vot ______
vac ______		
fod ______		
leq ______		
lar ______		
vef ______		
fub ______		

Trial 9 (Recitation)

Whole	Pure Part	Progressive Part
lup ______	lup ______	lup ______
vot ______	vot ______	vot ______
fij ______	fij ______	fij ______
fod ______		
leq ______		
vac ______		
vef ______		
fub ______		
lar ______		

Trial 10 (Recitation)

Whole	Pure Part	Progressive Part
vot ______	vot ______	vot ______
fij ______	fij ______	fij ______
lup ______	lup ______	lup ______
leq ______		
vac ______		
fod ______		
fub ______		
lar ______		
vef ______		

Test List

Whole	Pure Part	Progressive Part
fij ______	fij ______	fij ______
vot ______	vot ______	vot ______
lup ______	lup ______	lup ______
vac ______		
leq ______		
fod ______		
lar ______		
fub ______		
vef ______		

Trial 11 (Reading)

Whole	Pure Part	Progressive Part
vot 857		
lup 173		
fij 591		
leq 175	leq 175	leq 175
fod 598	fod 598	fod 598
vac 852	vac 852	vac 852
fub 596		
vef 854		
lar 179		

✓

Trial 12 (Recitation)

Whole	**Pure Part**	**Progressive Part**
lup ______		
fij ______		
vot ______		
fod ______	fod ______	fod ______
vac ______	vac ______	vac ______
leq ______	leq ______	leq ______
vef ______		
lar ______		
fub ______		

Trial 13 (Recitation)

Whole	**Pure Part**	**Progressive Part**
fij ______		
vot ______		
lup ______		
vac ______	vac ______	vac ______
leq ______	leq ______	leq ______
fod ______	fod ______	fod ______
lar ______		
fub ______		
vef ______		

Trial 14 (Recitation)

Whole	**Pure Part**	**Progressive Part**
vot ______		
lup ______		
fij ______		
leq ______	leq ______	leq ______
fod ______	fod ______	fod ______
vac ______	vac ______	vac ______
fub ______		
vef ______		
lar ______		

Trial 15 (Recitation)

Whole	**Pure Part**	**Progressive Part**
lup ______		
fij ______		
vot ______		
fod ______	fod ______	fod ______
vac ______	vac ______	vac ______
leq ______	leq ______	leq ______
vef ______		
lar ______		
fub ______		

Trial 16 (Reading)

Whole	**Pure Part**	**Progressive Part**
vot 857		
lup 173		
fij 591		
leq 175	leq 175	leq 175
fod 598	fod 598	fod 598
vac 852	vac 852	vac 852
fub 596		
vef 854		
lar 179		

Trial 17 (Recitation)

Whole	**Pure Part**	**Progressive Part**
vot ______		
fij ______		
lup ______		
leq ______	leq ______	leq ______
vac ______	vac ______	vac ______
fod ______	fod ______	fod ______
fub ______		
lar ______		
vef ______		

Trial 18 (Recitation)

Whole	Pure Part	Progressive Part
fij ______		
lup ______		
vot ______		
vac ______	vac ______	vac ______
fod ______	fod ______	fod ______
leq ______	leq ______	leq ______
lar ______		
vef ______		
fub ______		

Trial 19 (Recitation)

Whole	Pure Part	Progressive Part
lup ______		
vot ______		
fij ______		
fod ______	fod ______	fod ______
leq ______	leq ______	leq ______
vac ______	vac ______	vac ______
vef ______		
fub ______		
lar ______		

Trial 20 (Recitation)

Whole	Pure Part	Progressive Part
vot ______		
fij ______		
lup ______		
leq ______	leq ______	leq ______
vac ______	vac ______	vac ______
fod ______	fod ______	fod ______
fub ______		
lar ______		
vef ______		

Test List

Whole	Pure Part	Progressive Part
fij ______		
vot ______		
lup ______		
vac ______	vac ______	vac ______
leq ______	leq ______	leq ______
fod ______	fod ______	fod ______
lar ______		
fub ______		
vef ______		

Trial 21 (Reading)

Whole	Pure Part	Progressive Part
vot 857		vot 857
lup 173		lup 173
fij 591		fij 591
leq 175		leq 175
fod 598		fod 598
vac 852		vac 852
fub 596	fub 596	
vef 854	vef 854	
lar 179	lar 179	

Trial 22 (Recitation)

Whole	Pure Part	Progressive Part
lup ______		lup ______
fij ______		fij ______
vot ______		vot ______
fod ______		fod ______
vac ______		vac ______
leq ______		leq ______
vef ______	vef ______	
lar ______	lar ______	
fub ______	fub ______	

Trial 23 (Recitation)

Whole	**Pure Part**	**Progressive Part**
fij ______		fij ______
vot ______		vot ______
lup ______		lup ______
vac ______		vac ______
leq ______		leq ______
fod ______		fod ______
lar ______	lar ______	
fub ______	fub ______	
vef ______	vef ______	

Trial 24 (Recitation)

Whole	**Pure Part**	**Progressive Part**
vot ______		vot ______
lup ______		lup ______
fij ______		fij ______
leq ______		leq ______
fod ______		fod ______
vac ______		vac ______
fub ______	fub ______	
vef ______	vef ______	
lar ______	lar ______	

Trial 25 (Recitation)

Whole	**Pure Part**	**Progressive Part**
lup ______		lup ______
fij ______		fij ______
vot ______		vot ______
fod ______		fod ______
vac ______		vac ______
leq ______		leq ______
vef ______	vef ______	
lar ______	lar ______	
fub ______	fub ______	

Trial 26 (Reading)

Whole		**Pure Part**		**Progressive Part**	
vot	857				
lup	173				
fij	591				
leq	175				
fod	598				
vac	852				
fub	596	fub	596	fub	596
vef	854	vef	854	vef	854
lar	179	lar	179	lar	179

Trial 27 (Recitation)

Whole		**Pure Part**		**Progressive Part**	
vot	______				
fij	______				
lup	______				
leq	______				
vac	______				
fod	______				
fub	______	fub	______	ver	______
lar	______	lar	______	lar	______
vef	______	vef	______	fub	______

Trial 28 (Recitation)

Whole		**Pure Part**		**Progressive Part**	
fij	______				
lup	______				
vot	______				
vac	______				
fod	______				
leq	______				
lar	______	lar	______	lar	______
vef	______	vef	______	fub	______
fub	______	fub	______	vef	______

Trial 29 (Recitation)

Whole

lup ______
vot ______
fij ______
fod ______
leq ______
vac ______
vef ______
fub ______
lar ______

Pure Part

vef ______
fub ______
lar ______

Progressive Part

fub ______
vef ______
lar ______

Trial 30 (Recitation)

Whole

vot ______
fij ______
lup ______
leq ______
vac ______
fod ______
fub ______
lar ______
vef ______

Pure Part

fub ______
lar ______
vef ______

Progressive Part

vef ______
lar ______
fub ______

Test List

Whole

fij ______
vot ______
lup ______
vac ______
leq ______
fod ______
lar ______
fub ______
vef ______

Pure Part

lar ______
fub ______
vef ______

Progressive Part

lar ______
fub ______
vef ______

Trial 31 (Reading)

Whole

vot	857
lup	173
fij	591
leq	175
fod	598
vac	852
fub	596
vef	854
lar	179

Pure Part

vot	857
lup	173
fij	591
leq	175
fod	598
vac	852
fub	596
vef	854
lar	179

Progressive Part

fub	596
vef	854
lar	179

Trial 32 (Recitation)

Whole

lup ________
fij ________
vot ________
fod ________
vac ________
leq ________
vef ________
lar ________
fub ________

Pure Part

lup ________
fij ________
vot ________
fod ________
vac ________
leq ________
vef ________
lar ________
fub ________

Progressive Part

fub ________
lar ________
vef ________

Trial 33 (Recitation)

Whole

fij ________
vot ________
lup ________
vac ________
leq ________
fod ________
lar ________
fub ________
vef ________

Pure Part

fij ________
vot ________
lup ________
vac ________
leq ________
fod ________
lar ________
fub ________
vef ________

Progressive Part

lar ________
vef ________
fub ________

Trial 34 (Recitation)

Whole	Pure Part	Progressive Part
vot ______	vot ______	
lup ______	lup ______	
fij ______	fij ______	
leq ______	leq ______	
fod ______	fod ______	
vac ______	vac ______	
fub ______	fub ______	vef ______
vef ______	vef ______	fub ______
lar ______	lar ______	lar ______

Trial 35 (Recitation)

Whole	Pure Part	Progressive Part
lup ______	lup ______	
fij ______	fij ______	
vot ______	vot ______	
fod ______	fod ______	
vac ______	vac ______	
leq ______	leq ______	
vef ______	vef ______	fub ______
lar ______	lar ______	[illegible] ______
fub ______	fub ______	vef ______

Trial 36 (Reading)

Whole		Pure Part		Progressive Part	
vot	857	vot	857	vot	857
lup	173	lup	173	lup	173
fij	591	fij	591	fij	591
leq	175	leq	175	leq	175
fod	598	fod	598	fod	598
vac	852	vac	852	vac	852
fub	596	fub	596	fub	596
vef	854	vef	854	vef	854
lar	179	lar	179	lar	179

Trial 37 (Recitation)

Whole	Pure Part	Progressive Part
vot ______	vot ______	vot ______
fij ______	fij ______	fij ______
lup ______	lup ______	lup ______
leq ______	leq ______	leq ______
vac ______	vac ______	vac ______
fod ______	fod ______	fod ______
fub ______	fub ______	fub ______
lar ______	lar ______	lar ______
vef ______	vef ______	vef ______

Trial 38 (Recitation)

Whole	Pure Part	Progressive Part
fij ______	fij ______	fij ______
lup ______	lup ______	lup ______
vot ______	vot ______	vot ______
vac ______	vac ______	vac ______
fod ______	fod ______	fod ______
leq ______	leq ______	leq ______
lar ______	lar ______	lar ______
vef ______	vef ______	vef ______
fub ______	fub ______	fub ______

Trial 39 (Recitation)

Whole	Pure Part	Progressive Part
lup ______	lup ______	lup ______
vot ______	vot ______	vot ______
fij ______	fij ______	fij ______
fod ______	fod ______	fod ______
leq ______	leq ______	leq ______
vac ______	vac ______	vac ______
vef ______	vef ______	vef ______
fub ______	fub ______	fub ______
lar ______	lar ______	lar ______

Trial 40 (Recitation)

Whole	Pure Part	Progressive Part
vot ______	vot ______	vot ______
fij ______	fij ______	fij ______
lup ______	lup ______	lup ______
leq ______	leq ______	leq ______
vac ______	vac ______	vac ______
fod ______	fod ______	fod ______
fub ______	fub ______	fub ______
lar ______	lar ______	lar ______
vef ______	vef ______	vef ______

Test List

Whole	Pure Part	Progressive Part
fij ______	fij ______	fij ______
vot ______	vot ______	vot ______
lup ______	lup ______	lup ______
vac ______	vac ______	vac ______
leq ______	leq ______	leq ______
fod ______	fod ______	fod ______
lar ______	lar ______	lar ______
fub ______	fub ______	fub ______
vef ______	vef ______	vef ______

Logical III

Trial 1 (Reading)

Whole		Pure Part		Progressive Part	
jow	264	jow	264	jow	264
wug	613	wug	613	wug	613
cam	942	cam	942	cam	942
woc	615				
cip	946				
jek	261				
cuv	948				
jid	267				
wab	619				

Trial 2 (Recitation)

Whole		Pure Part		Progressive Part	
wug	______	wug	______	wug	______
cam	______	cam	______	cam	______
jow	______	jow	______	jow	______
cip	______				
jek	______				
woc	______				
jid	______				
wab	______				
cuv	______				

Trial 3 (Recitation)

Whole		Pure Part		Progressive Part	
cam	______	cam	______	cam	______
jow	______	jow	______	jow	______
wug	______	wug	______	wug	______
jek	______				
woc	______				
cip	______				
wab	______				
cuv	______				
jid	______				

Trial 4 (Recitation)

Whole	**Pure Part**	**Progressive Part**
jow ______	jow ______	jow ______
wug ______	wug ______	wug ______
cam ______	cam ______	cam ______
woc ______		
cip ______		
jek ______		
cuv ______		
jid ______		
wab ______		

Trial 5 (Recitation)

Whole	**Pure Part**	**Progressive Part**
wug ______	wug ______	wug ______
cam ______	cam ______	cam ______
jow ______	jow ______	jow ______
cip ______		
jek ______		
woc ______		
jid ______		
wab ______		
cuv ______		

Trial 6 (Reading)

Whole	**Pure Part**	**Progressive Part**
jow 264	jow 264	jow 264
wug 613	wug 613	wug 613
cam 942	cam 942	cam 942
woc 615		
cip 946		
jek 261		
cuv 948		
jid 267		
wab 619		

Trial 7 (Recitation)

Whole	**Pure Part**	**Progressive Part**
jow ______	jow ______	jow ______
cam ______	cam ______	cam ______
wug ______	wug ______	wug ______
woc ______		
jek ______		
cip ______		
cuv ______		
wab ______		
jid ______		

Trial 8 (Recitation)

Whole	**Pure Part**	**Progressive Part**
cam ______	cam ______	cam ______
wug ______	wug ______	wug ______
jow ______	jow ______	jow ______
jek ______		
cip ______		
woc ______		
wab ______		
jid ______		
cuv ______		

Trial 9 (Recitation)

Whole	**Pure Part**	**Progressive Part**
wug ______	wug ______	wug ______
jow ______	jow ______	jow ______
cam ______	cam ______	cam ______
cip ______		
woc ______		
jek ______		
jid ______		
cuv ______		
wab ______		

Trial 10 (Recitation)

Whole	**Pure Part**	**Progressive Part**
jow ______	jow ______	jow ______
cam ______	cam ______	cam ______
wug ______	wug ______	wug ______
woc ______		
jek ______		
cip ______		
cuv ______		
wab ______		
jid ______		

Test List

Whole	**Pure Part**	**Progressive Part**
cam ______	cam ______	cam ______
jow ______	jow ______	jow ______
wug ______	wug ______	wug ______
jek ______		
woc ______		
cip ______		
wab ______		
cuv ______		
jid ______		

Trial 11 (Reading)

Whole		**Pure Part**		**Progressive Part**	
jow	264				
wug	613				
cam	942				
woc	615	woc	615	woc	615
cip	946	cip	946	cip	946
jek	261	jek	261	jek	261
cuv	948				
jid	267				
wab	619				

Trial 12 (Recitation)

Whole

wug ______
cam ______
jow ______
cip ______
jek ______
woc ______
jid ______
wab ______
cuv ______

Pure Part

cip ______
jek ______
woc ______

Progressive Part

cip ______
jek ______
woc ______

Trial 13 (Recitation)

Whole

cam ______
jow ______
wug ______
jek ______
woc ______
cip ______
wab ______
cuv ______
jid ______

Pure Part

jek ______
woc ______
cip ______

Progressive Part

jek ______
woc ______
cip ______

Trial 14 (Recitation)

Whole

jow ______
wug ______
cam ______
woc ______
cip ______
jek ______
cuv ______
jid ______
wab ______

Pure Part

woc ______
cip ______
jek ______

Progressive Part

woc ______
cip ______
jek ______

Trial 15 (Recitation)

Whole	Pure Part	Progressive Part
wug ______		
cam ______		
jow ______		
cip ______	cip ______	cip ______
jek ______	jek ______	jek ______
woc ______	woc ______	woc ______
jid ______		
wab ______		
cuv ______		

Trial 16 (Reading)

Whole	Pure Part	Progressive Part
jow 264		
wug 613		
cam 942		
woc 615	woc 615	woc 615
cip 946	cip 946	cip 946
jek 261	jek 261	jek 261
cuv 948		
jid 267		
wab 619		

Trial 17 (Recitation)

Whole	Pure Part	Progressive Part
jow ______		
cam ______		
wug ______		
woc ______	woc ______	woc ______
jek ______	jek ______	jek ______
cip ______	cip ______	cip ______
cuv ______		
wab ______		
jid ______		

Trial 18 (Recitation)

Whole	Pure Part	Progressive Part
cam ______		
wug ______		
jow ______		
jek ______	jek ______	jek ______
cip ______	cip ______	cip ______
woc ______	woc ______	woc ______
wab ______		
jid ______		
cuv ______		

Trial 19 (Recitation)

Whole	Pure Part	Progressive Part
wug ______		
jow ______		
cam ______		
cip ______	cip ______	cip ______
woc ______	woc ______	woc ______
jek ______	jek ______	jek ______
jid ______		
cuv ______		
wab ______		

Trial 20 (Recitation)

Whole	Pure Part	Progressive Part
jow ______		
cam ______		
wug ______		
woc ______	woc ______	woc ______
jek ______	jek ______	jek ______
cip ______	cip ______	cip ______
cuv ______		
wab ______		
jid ______		

Test List

Whole

cam ______
jow ______
wug ______
jek ______
woc ______
cip ______
wab ______
cuv ______
jid ______

Pure Part

jek ______
woc ______
cip ______

Progressive Part

jek ______
woc ______
cip ______

Trial 21 (Reading)

Whole

jow	264
wug	613
cam	942
woc	615
cip	946
jek	261
cuv	948
jid	267
wab	619

Pure Part

cuv	948
jid	267
wab	619

Progressive Part

jow	264
wug	613
cam	942
woc	615
cip	946
jek	261

Trial 22 (Recitation)

Whole

wug ______
cam ______
jow ______
cip ______
jek ______
woc ______
jid ______
wab ______
cuv ______

Pure Part

jid ______
wab ______
cuv ______

Progressive Part

wug ______
cam ______
jow ______
cip ______
jek ______
woc ______

Trial 23 (Recitation)

Whole	**Pure Part**	**Progressive Part**
cam ______		cam ______
jow ______		jow ______
wug ______		wug ______
jek ______		jek ______
woc ______		woc ______
cip ______		cip ______
wab ______	wab ______	
cuv ______	cuv ______	
jid ______	jid ______	

Trial 24 (Recitation)

Whole	**Pure Part**	**Progressive Part**
jow ______		jow ______
wug ______		wug ______
cam ______		cam ______
woc ______		woc ______
cip ______		cip ______
jek ______		jek ______
cuv ______	cuv ______	
jid ______	jid ______	
wab ______	wab ______	

Trial 25 (Recitation)

Whole	**Pure Part**	**Progressive Part**
wug ______		wug ______
cam ______		cam ______
jow ______		jow ______
cip ______		cip ______
jek ______		jek ______
woc ______		woc ______
jid ______	jid ______	
wab ______	wab ______	
cuv ______	cuv ______	

Trial 26 (Reading)

Whole		**Pure Part**		**Progressive Part**	
jow	264				
wug	613				
cam	942				
woc	615				
cip	946				
jek	261				
cuv	948	cuv	948	cuv	948
jid	267	jid	267	jid	267
wab	619	wab	619	wab	619

Trial 27 (Recitation)

Whole		**Pure Part**		**Progressive Part**	
jow					
cam					
wug					
woc					
jek					
cip					
cuv		cuv		jid	
wab		wab		wab	
jid		jid		cuv	

Trial 28 (Recitation)

Whole		**Pure Part**		**Progressive Part**	
cam					
wug					
jow					
jek					
cip					
woc					
wab		wab		wab	
jid		jid		cuv	
cuv		cuv		jid	

Trial 29 (Recitation)

Whole	**Pure Part**	**Progressive Part**
wug ______		
jow ______		
cam ______		
cip ______		
woc ______		
jek ______		
jid ______	jid ______	cuv ______
cuv ______	cuv ______	jid ______
wab ______	wab ______	wab ______

Trial 30 (Recitation)

Whole	**Pure Part**	**Progressive Part**
jow ______		
cam ______		
wug ______		
woc ______		
jek ______		
cip ______		
cuv ______	cuv ______	jid ______
wab ______	wab ______	wab ______
jid ______	jid ______	cuv ______

Test List

Whole	**Pure Part**	**Progressive Part**
cam ______		
jow ______		
wug ______		
jek ______		
woc ______		
cip ______		
wab ______	wab ______	wab ______
cuv ______	cuv ______	cuv ______
jid ______	jid ______	jid ______

Trial 31 (Reading)

Whole	Pure Part	Progressive Part
jow 264	jow 264	
wug 613	wug 613	
cam 942	cam 942	
woc 615	woc 615	
cip 946	cip 946	
jek 261	jek 261	
cuv 948	cuv 948	cuv 948
jid 267	jid 267	jid 267
wab 619	wab 619	wab 619

Trial 32 (Recitation)

Whole	Pure Part	Progressive Part
wug ______	wug ______	
cam ______	cam ______	
jow ______	jow ______	
cip ______	cip ______	
jek ______	jek ______	
woc ______	woc ______	
jid ______	jid ______	cuv ______
wab ______	wab ______	wab ______
cuv ______	cuv ______	jid ______

Trial 33 (Recitation)

Whole	Pure Part	Progressive Part
cam ______	cam ______	
jow ______	jow ______	
wug ______	wug ______	
jek ______	jek ______	
woc ______	woc ______	
cip ______	cip ______	
wab ______	wab ______	wab ______
cuv ______	cuv ______	jid ______
jid ______	jid ______	cuv ______

Trial 34 (Recitation)

Whole	Pure Part	Progressive Part
jow ______	jow ______	______
wug ______	wug ______	______
cam ______	cam ______	______
woc ______	woc ______	______
cip ______	cip ______	______
jek ______	jek ______	______
cuv ______	cuv ______	jid ______
jid ______	jid ______	cuv ______
wab ______	wab ______	wab ______

Trial 35 (Recitation)

Whole	Pure Part	Progressive Part
wug ______	wug ______	______
cam ______	cam ______	______
jow ______	jow ______	______
cip ______	cip ______	______
jek ______	jek ______	______
woc ______	woc ______	______
jid ______	jid ______	cuv ______
wab ______	wab ______	wab ______
cuv ______	cuv ______	jid ______

Trial 36 (Reading)

Whole		Pure Part		Progressive Part	
jow	264	jow	264	jow	264
wug	613	wug	613	wug	613
cam	942	cam	942	cam	942
woc	615	woc	615	woc	615
cip	946	cip	946	cip	946
jek	261	jek	261	jek	261
cuv	948	cuv	948	cuv	948
jid	267	jid	267	jid	267
wab	619	wab	619	wab	619

Trial 37 (Recitation)

Whole	Pure Part	Progressive Part
jow ______	jow ______	jow ______
cam ______	cam ______	cam ______
wug ______	wug ______	wug ______
woc ______	woc ______	woc ______
jek ______	jek ______	jek ______
cip ______	cip ______	cip ______
cuv ______	cuv ______	cuv ______
wab ______	wab ______	wab ______
jid ______	jid ______	jid ______

Trial 38 (Recitation)

Whole	Pure Part	Progressive Part
cam ______	cam ______	cam ______
wug ______	wug ______	wug ______
jow ______	jow ______	jow ______
jek ______	jek ______	jek ______
cip ______	cip ______	cip ______
woc ______	woc ______	woc ______
wab ______	wab ______	wab ______
jid ______	jid ______	jid ______
cuv ______	cuv ______	cuv ______

Trial 39 (Recitation)

Whole	Pure Part	Progressive Part
wug ______	wug ______	wug ______
jow ______	jow ______	jow ______
cam ______	cam ______	cam ______
cip ______	cip ______	cip ______
woc ______	woc ______	woc ______
jek ______	jek ______	jek ______
jid ______	jid ______	jid ______
cuv ______	cuv ______	cuv ______
wab ______	wab ______	wab ______

Trial 40 (Recitation)

Whole	**Pure Part**	**Progressive Part**
jow ______	jow ______	jow ______
cam ______	cam ______	cam ______
wug ______	wug ______	wug ______
woc ______	woc ______	woc ______
jek ______	jek ______	jek ______
cip ______	cip ______	cip ______
cuv ______	cuv ______	cuv ______
wab ______	wab ______	wab ______
jid ______	jid ______	jid ______

Test List

Whole	**Pure Part**	**Progressive Part**
cam ______	cam ______	cam ______
jow ______	jow ______	jow ______
wug ______	wug ______	wug ______
jek ______	jek ______	jek ______
woc ______	woc ______	woc ______
cip ______	cip ______	cip ______
wab ______	wab ______	wab ______
cuv ______	cuv ______	cuv ______
jid ______	jid ______	jid ______

Logical IV

Trial 1 (Reading)

Whole	**Pure Part**	**Progressive Part**
zud 352	zud 352	zud 352
ros 125	ros 125	ros 125
gej 816	gej 816	gej 816
reg 128		
gix 813		
zap 357		
guz 819		
zob 354		
ral 121		

Trial 2 (Recitation)

Whole	**Pure Part**	**Progressive Part**
ros ______	ros ______	ros ______
gej ______	gej ______	gej ______
zud ______	zud ______	zud ______
gix ______		
zap ______		
reg ______		
zob ______		
ral ______		
guz ______		

Trial 3 (Recitation)

Whole	**Pure Part**	**Progressive Part**
gej ______	gej ______	gej ______
zud ______	zud ______	zud ______
ros ______	ros ______	ros ______
zap ______		
reg ______		
gix ______		
ral ______		
guz ______		
zob ______		

Trial 4 (Recitation)

Whole	**Pure Part**	**Progressive Part**
zud ______	zud ______	zud ______
ros ______	ros ______	ros ______
gej ______	gej ______	gej ______
reg ______		
gix ______		
zap ______		
guz ______		
zob ______		
ral ______		

Trial 5 (Recitation)

Whole	**Pure Part**	**Progressive Part**
ros ______	ros ______	ros ______
gej ______	gej ______	gej ______
zud ______	zud ______	zud ______
gix ______		
zap ______		
reg ______		
zob ______		
ral ______		
guz ______		

Trial 6 (Reading)

Whole		**Pure Part**		**Progressive Part**	
zud	352	zud	352	zud	352
ros	125	ros	125	ros	125
gej	816	gej	816	gej	816
reg	128				
gix	813				
zap	357				
guz	819				
zob	354				
ral	121				

Trial 7 (Recitation)

Whole

zud ______
gej ______
ros ______
reg ______
zap ______
gix ______
guz ______
ral ______
zob ______

Pure Part

zud ______
gej ______
ros ______

Progressive Part

zud ______
gej ______
ros ______

Trial 8 (Recitation)

Whole

gej ______
ros ______
zud ______
zap ______
gix ______
reg ______
ral ______
zob ______
guz ______

Pure Part

gej ______
ros ______
zud ______

Progressive Part

gej ______
ros ______
zud ______

Trial 9 (Recitation)

Whole

ros ______
zud ______
gej ______
gix ______
reg ______
zap ______
zob ______
guz ______
ral ______

Pure Part

ros ______
zud ______
gej ______

Progressive Part

ros ______
zud ______
gej ______

Trial 10 (Recitation)

Whole	Pure Part	Progressive Part
zud ______	zud ______	zud ______
gej ______	gej ______	gej ______
ros ______	ros ______	ros ______
reg ______		
zap ______		
gix ______		
guz ______		
ral ______		
zob ______		

Test List

Whole	Pure Part	Progressive Part
gej ______	gej ______	gej ______
zud ______	zud ______	zud ______
ros ______	ros ______	ros ______
zap ______		
reg ______		
gix ______		
ral ______		
guz ______		
zob ______		

Trial 11 (Reading)

Whole	Pure Part	Progressive Part
zud 352		
ros 125		
gej 816		
reg 128	reg 128	reg 128
gix 813	gix 813	gix 813
zap 357	zap 357	zap 357
guz 819		
zob 354		
ral 121		

Trial 12 (Recitation)

Whole	**Pure Part**	**Progressive Part**
ros ______		
gej ______		
zud ______		
gix ______	gix ______	gix ______
zap ______	zap ______	zap ______
reg ______	reg ______	reg ______
zob ______		
ral ______		
guz ______		

Trial 13 (Recitation)

Whole	**Pure Part**	**Progressive Part**
gej ______		
zud ______		
ros ______		
zap ______	zap ______	zap ______
reg ______	reg ______	reg ______
gix ______	gix ______	gix ______
ral ______		
guz ______		
zob ______		

Trial 14 (Recitation)

Whole	**Pure Part**	**Progressive Part**
zud ______		
ros ______		
gej ______		
reg ______	reg ______	reg ______
gix ______	gix ______	gix ______
zap ______	zap ______	zap ______
guz ______		
zob ______		
ral ______		

Trial 15 (Recitation)

Whole	**Pure Part**	**Progressive Part**
ros ______		______
gej ______		______
zud ______		______
gix ______	gix ______	gix ______
zap ______	zap ______	zap ______
reg ______	reg ______	reg ______
zob ______		______
ral ______		______
guz ______		______

Trial 16 (Reading)

Whole	**Pure Part**	**Progressive Part**
zud 352		______
ros 125		______
gej 816		______
reg 128	reg 128	reg 128
gix 813	gix 813	gix 813
zap 357	zap 357	zap 357
guz 819		______
zob 354		______
ral 121		______

Trial 17 (Recitation)

Whole	**Pure Part**	**Progressive Part**
zud ______		______
gej ______		______
ros ______		______
reg ______	reg ______	reg ______
zap ______	zap ______	zap ______
gix ______	gix ______	gix ______
guz ______		______
ral ______		______
zob ______		______

Trial 18 (Recitation)

Whole	Pure Part	Progressive Part
gej ______		
ros ______		
zud ______		
zap ______	zap ______	zap ______
gix ______	gix ______	gix ______
reg ______	reg ______	reg ______
rai ______		
zob ______		
guz ______		

Trial 19 (Recitation)

Whole	Pure Part	Progressive Part
ros ______		
zud ______		
gej ______		
gix ______	gix ______	gix ______
reg ______	reg ______	reg ______
zap ______	zap ______	zap ______
zob ______		
guz ______		
ral ______		

Trial 20 (Recitation)

Whole	Pure Part	Progressive Part
zud ______		
gej ______		
ros ______		
reg ______	reg ______	reg ______
zap ______	zap ______	zap ______
gix ______	gix ______	gix ______
guz ______		
ral ______		
zob ______		

Test List

Whole	Pure Part	Progressive Part
gej ______		
zud ______		
ros ______		
zap ______	zap ______	zap ______
reg ______	reg ______	reg ______
gix ______	gix ______	gix ______
ral ______		
guz ______		
zob ______		

Trial 21 (Reading)

Whole	Pure Part	Progressive Part
zud 352		zud 352
ros 125		ros 125
gej 816		gej 816
reg 128		reg 128
gix 813		gix 813
zap 357		zap 357
guz 819	guz 819	
zob 354	zob 354	
ral 121	ral 121	

Trial 22 (Recitation)

Whole	Pure Part	Progressive Part
ros ______		ros ______
gej ______		gej ______
zud ______		zud ______
gix ______		gix ______
zap ______		zap ______
reg ______		reg ______
zob ______	zob ______	
ral ______	ral ______	
guz ______	guz ______	

Trial 23 (Recitation)

Whole	Pure Part	Progressive Part
gej ______		gej ______
zud ______		zud ______
ros ______		ros ______
zap ______		zap ______
reg ______		reg ______
gix ______		gix ______
ral ______	ral ______	
gus ______	gus ______	
zob ______	zob ______	

Trial 24 (Recitation)

Whole	Pure Part	Progressive Part
zud ______		zud ______
ros ______		ros ______
gej ______		gej ______
reg ______		reg ______
gix ______		gix ______
zap ______		zap ______
gus ______	gus ______	
zob ______	zob ______	
ral ______	ral ______	

Trial 25 (Recitation)

Whole	Pure Part	Progressive Part
ros ______		ros ______
gej ______		gej ______
zud ______		zud ______
gix ______		gix ______
zap ______		zap ______
reg ______		reg ______
zob ______	zob ______	
ral ______	ral ______	
gus ______	gus ______	

Trial 26 (Reading)

Whole	Pure Part	Progressive Part
zud 352		
ros 125		
gej 816		
reg 128		
gix 813		
zap 357		
guz 819	guz 819	guz 819
zob 354	zob 354	zob 354
ral 121	ral 121	ral 121

Trial 27 (Recitation)

Whole	Pure Part	Progressive Part
zud ______		
gej ______		
ros ______		
reg ______		
zap ______		
gix ______		
guz ______	guz ______	zob ______
ral ______	ral ______	ral ______
zob ______	zob ______	guz ______

Trial 28 (Recitation)

Whole	Pure Part	Progressive Part
gej ______		
ros ______		
zud ______		
zap ______		
gix ______		
reg ______		
ral ______	ral ______	ral ______
zob ______	zob ______	guz ______
guz ______	guz ______	zob ______

Trial 29 (Recitation)

Whole	Pure Part	Progressive Part
ros ______		
zud ______		
gej ______		
gix ______		
reg ______		
zap ______		
zob ______	zob ______	guz ______
guz ______	guz ______	zob ______
ral ______	ral ______	ral ______

Trial 30 (Recitation)

Whole	Pure Part	Progressive Part
zud ______		
gej ______		
ros ______		
reg ______		
zap ______		
gix ______		
guz ______	guz ______	zob ______
ral ______	ral ______	ral ______
zob ______	zob ______	guz ______

Test List

Whole	Pure Part	Progressive Part
gej ______		
zud ______		
ros ______		
zap ______		
reg ______		
gix ______		
ral ______	ral ______	ral ______
guz ______	guz ______	guz ______
zob ______	zob ______	zob ______

Trial 31 (Reading)

Whole		**Pure Part**		**Progressive Part**	
zud	352	zud	352	______	
ros	125	ros	125	______	
gej	816	gej	816	______	
reg	128	reg	128	______	
gix	813	gix	813	______	
zap	357	zap	357	______	
guz	819	guz	819	guz	819
zob	354	zob	354	zob	354
ral	121	ral	121	ral	121

Trial 32 (Recitation)

Whole		**Pure Part**		**Progressive Part**	
ros	______	ros	______	______	
gej	______	gej	______	______	
zud	______	zud	______	______	
gix	______	gix	______	______	
zap	______	zap	______	______	
reg	______	reg	______	______	
zob	______	zob	______	guz	______
ral	______	ral	______	ral	______
guz	______	guz	______	zob	______

Trial 33 (Recitation)

Whole		**Pure Part**		**Progressive Part**	
gej	______	gej	______		
zud	______	zud	______		
ros	______	ros	______		
zap	______	zap	______		
reg	______	reg	______		
gix	______	gix	______		
ral	______	ral	______	ral	______
guz	______	guz	______	zob	______
zob	______	zob	______	guz	______

Trial 34 (Recitation)

Whole		Pure Part		Progressive Part	
zud	______	zud	______		
ros	______	ros	______		
gej	______	gej	______		
reg	______	reg	______		
gix	______	gix	______		
zap	______	zap	______		
guz	______	guz	______	zob	______
zob	______	zob	______	guz	______
ral	______	ral	______	ral	______

Trial 35 (Recitation)

Whole		Pure Part		Progressive Part	
ros	______	ros	______		
gej	______	gej	______		
zud	______	zud	______		
gix	______	gix	______		
zap	______	zap	______		
reg	______	reg	______		
zob	______	zob	______	guz	______
ral	______	ral	______	ral	______
guz	______	guz	______	zob	______

Trial 36 (Reading)

Whole		Pure Part		Progressive Part	
zud	352	zud	352	zud	352
ros	125	ros	125	ros	125
gej	816	gej	816	gej	816
reg	128	reg	128	reg	128
gix	813	gix	813	gix	813
zap	357	zap	357	zap	357
guz	819	guz	819	guz	819
zob	354	zob	354	zob	354
ral	121	ral	121	ral	121

Trial 37 (Recitation)

Whole	**Pure Part**	**Progressive Part**
zud ______	zud ______	zud ______
gej ______	gej ______	gej ______
ros ______	ros ______	ros ______
reg ______	reg ______	reg ______
zap ______	zap ______	zap ______
gix ______	gix ______	gix ______
guz ______	guz ______	guz ______
ral ______	ral ______	ral ______
zob ______	zob ______	zob ______

Trial 38 (Recitation)

Whole	**Pure Part**	**Progressive Part**
gej ______	gej ______	gej ______
ros ______	ros ______	ros ______
zud ______	zud ______	zud ______
zap ______	zap ______	zap ______
gix ______	gix ______	gix ______
reg ______	reg ______	reg ______
ral ______	ral ______	ral ______
zob ______	zob ______	zob ______
guz ______	guz ______	guz ______

Trial 39 (Recitation)

Whole	**Pure Part**	**Progressive Part**
ros ______	ros ______	ros ______
zud ______	zud ______	zud ______
gej ______	gej ______	gej ______
gix ______	gix ______	gix ______
reg ______	reg ______	reg ______
zap ______	zap ______	zap ______
zob ______	zob ______	zob ______
guz ______	guz ______	guz ______
ral ______	ral ______	ral ______

Trial 40 (Recitation)

Whole	**Pure Part**	**Progressive Part**
zud ______	zud ______	zud ______
gej ______	gej ______	gej ______
ros ______	ros ______	ros ______
reg ______	reg ______	reg ______
zap ______	zap ______	zap ______
gix ______	gix ______	gix ______
guz ______	guz ______	guz ______
ral ______	ral ______	ral ______
zob ______	zob ______	zob ______

Test List

Whole	**Pure Part**	**Progressive Part**
gej ______	gej ______	gej ______
zud ______	zud ______	zud ______
ros ______	ros ______	ros ______
zap ______	zap ______	zap ______
reg ______	reg ______	reg ______
gix ______	gix ______	gix ______
ral ______	ral ______	ral ______
guz ______	guz ______	guz ______
zob ______	zob ______	zob ______

Non-logical I

Trial 1 (Reading)

Whole		Pure Part		Progressive Part	
zoq	614	zoq	614	zoq	614
tus	467	tus	467	tus	467
mev	921	mev	921	mev	921
tib	753				
mog	142				
zaw	379				
muj	835				
zic	586				
tep	298				

Trial 2 (Reading)

Whole		Pure Part		Progressive Part	
tus	467	tus	467	tus	467
mev	921	mev	921	mev	921
zoq	614	zoq	614	zoq	614
mog	142				
zaw	379				
tib	753				
zic	586				
tep	298				
muj	835				

Trial 3 (Reading)

Whole		Pure Part		Progressive Part	
mev	921	mev	921	mev	921
zoq	614	zoq	614	zoq	614
tus	467	tus	467	tus	467
zaw	379				
tib	753				
mog	142				
tep	298				
muj	835				
zic	586				

Trial 4 (Reading)

Whole		Pure Part		Progressive Part	
zoq	614	zoq	614	zoq	614
tus	467	tus	467	tus	467
mev	921	mev	921	mev	921
tib	753				
mog	142				
zaw	379				
muj	835				
zic	586				
tep	298				

Trial 5 (Reading)

Whole		Pure Part		Progressive Part	
tus	467	tus	467	tus	467
mev	921	mev	921	mev	921
zoq	614	zoq	614	zoq	614
mog	142				
zaw	379				
tib	753				
zic	586				
tep	298				
muj	835				

Trial 6 (Reading)

Whole		Pure Part		Progressive Part	
zoq	614	zoq	614	zoq	614
tus	467	tus	467	tus	467
mev	921	mev	921	mev	921
tib	753				
mog	142				
zaw	379				
muj	835				
zic	586				
tep	298				

Trial 7 (Reading)

Whole		Pure Part		Progressive Part	
zoq	614	zoq	614	zoq	614
mev	921	mev	921	mev	921
tus	467	tus	467	tus	467
tib	753				
zaw	379				
mog	142				
muj	835				
tep	298				
zic	586				

Trial 8 (Reading)

Whole		Pure Part		Progressive Part	
mev	921	mev	921	mev	921
tus	467	tus	467	tus	467
zoq	614	zoq	614	zoq	614
zaw	379				
mog	142				
tib	753				
tep	298				
zic	586				
muj	835				

Trial 9 (Reading)

Whole		Pure Part		Progressive Part	
tus	467	tus	467	tus	467
zoq	614	zoq	614	zoq	614
mev	921	mev	921	mev	921
mog	142				
tib	753				
zaw	379				
zic	586				
muj	835				
tep	298				

Trial 10 (Reading)

Whole		Pure Part		Progressive Part	
zoq	614	zoq	614	zoq	614
mev	921	mev	921	mev	921
tus	467	tus	467	tus	467
tib	753				
zaw	379				
mog	142				
muj	835				
tep	298				
zic	586				

Test List

Whole		Pure Part		Progressive Part	
mev	____	mev	____	mev	____
zoq	____	zoq	____	zoq	____
tus	____	tus	____	tus	____
zaw	____				
tib	____				
mog	____				
tep	____				
muj	____				
zic	____				

Trial 11 (Reading)

Whole		Pure Part		Progressive Part	
zoq	614				
tus	467				
mev	921				
tib	753	tib	753	tib	753
mog	142	mog	142	mog	142
zaw	379	zaw	379	zaw	379
muj	835				
zic	586				
tep	298				

Trial 12 (Reading)

Whole		Pure Part		Progressive Part	
tus	467				
mev	921				
zoq	614				
mog	142	mog	142	mog	142
zaw	379	zaw	379	zaw	379
tib	753	tib	753	tib	753
zic	586				
tep	298				
muj	835				

Trial 13 (Reading)

Whole		Pure Part		Progressive Part	
mev	921				
zoq	614				
tus	467				
zaw	379	zaw	379	zaw	379
tib	753	tib	753	tib	753
mog	142	mog	142	mog	142
tep	298				
muj	835				
zic	586				

Trial 14 (Reading)

Whole		Pure Part		Progressive Part	
zoq	614				
tus	467				
mev	921				
tib	753	tib	753	tib	753
mog	142	mog	142	mog	142
zaw	379	zaw	379	zaw	379
muj	835				
zic	586				
tep	298				

Trial 15 (Reading)

Whole		Pure Part		Progressive Part	
tus	467				
mev	921				
zoq	614				
mog	142	mog	142	mog	142
zaw	379	zaw	379	zaw	379
tib	753	tib	753	tib	753
zic	586				
tep	298				
muj	835				

Trial 16 (Reading)

Whole		Pure Part		Progressive Part	
zoq	614				
tus	467				
mev	921				
tib	753	tib	753	tib	753
mog	142	mog	142	mog	142
zaw	379	zaw	379	zaw	379
muj	835				
zic	586				
tep	298				

Trial 17 (Reading)

Whole		Pure Part		Progressive Part	
zoq	614				
mev	921				
tus	467				
tib	753	tib	753	tib	753
zaw	379	zaw	379	zaw	379
mog	142	mog	142	mog	142
muj	835				
tep	298				
zic	586				

Trial 18 (Reading)

Whole		**Pure Part**		**Progressive Part**	
mev	921				
tus	467				
soq	614				
saw	379	saw	379	saw	379
mog	142	mog	142	mog	142
tib	753	tib	753	tib	753
tep	298				
sic	386				
muj	835				

Trial 19 (Reading)

Whole		**Pure Part**		**Progressive Part**	
tus	467				
soq	614				
mev	921				
mog	142	mog	142	mog	142
tib	753	tib	753	tib	753
saw	379	saw	379	saw	379
sic	386				
muj	835				
tep	298				

Trial 20 (Reading)

Whole		**Pure Part**		**Progressive Part**	
soq	614				
mev	921				
tus	467				
tib	753	tib	753	tib	753
saw	379	saw	379	saw	379
mog	142	mog	142	mog	142
muj	835				
tep	298				
sic	386				

Test List

Whole		Pure Part		Progressive Part	
mev	______				
zoq	______				
tus	______				
zaw	______	zaw	______	zaw	______
tib	______	tib	______	tib	______
mog	______	mog	______	mog	______
tep	______				
muj	______				
zic	______				

Trial 21 (Reading)

Whole		Pure Part		Progressive Part	
zoq	614			zoq	614
tus	467			tus	467
mev	921			mev	921
tib	753			tib	753
mog	142			mog	142
zaw	379			zaw	379
muj	835	muj	835		
zic	586	zic	586		
tep	298	tep	298		

Trial 22 (Reading)

Whole		Pure Part		Progressive Part	
tus	467			tus	467
mev	921			mev	921
zoq	614			zoq	614
mog	142			mog	142
zaw	379			zaw	379
tib	753			tib	753
zic	586	zic	586		
tep	298	tep	298		
muj	835	muj	835		

Trial 23 (Reading)

Whole		Pure Part		Progressive Part	
mev	921			mev	921
zoq	614			zoq	614
tus	467			tus	467
zaw	379			zaw	379
tib	753			tib	753
mog	142			mog	142
tep	298	tep	298		
muj	835	muj	835		
zic	586	zic	586		

Trial 24 (Reading)

Whole		Pure Part		Progressive Part	
zoq	614			zoq	614
tus	467			tus	467
mev	921			mev	921
tib	753			tib	753
mog	142			mog	142
zaw	379			zaw	379
muj	835	muj	835		
zic	586	zic	586		
tep	298	tep	298		

Trial 25 (Reading)

Whole		Pure Part		Progressive Part	
tus	467			tus	467
mev	921			mev	921
zoq	614			zoq	614
mog	142			mog	142
zaw	379			zaw	379
tib	753			tib	753
zic	586	zic	586		
tep	298	tep	298		
muj	835	muj	835		

Trial 26 (Reading)

Whole		Pure Part		Progressive Part	
zoq	614				
tus	467				
mev	921				
tib	753				
mog	142				
zaw	379				
muj	835	muj	835	muj	835
zic	586	zic	586	zic	586
tep	298	tep	298	tep	298

Trial 27 (Reading)

Whole		Pure Part		Progressive Part	
zoq	614				
mev	921				
tus	467				
tib	753				
zaw	379				
mog	142				
muj	835	muj	835	zic	586
tep	298	tep	298	tep	298
zic	586	zic	586	muj	835

Trial 28 (Reading)

Whole		Pure Part		Progressive Part	
mev	921				
tus	467				
zoq	614				
zaw	379				
mog	142				
tib	753				
tep	298	tep	298	tep	298
zic	586	zic	586	muj	835
muj	835	muj	835	zic	586

Trial 29 (Reading)

Whole		Pure Part		Progressive Part	
tus	467				
zoq	614				
mev	921				
mog	142				
tib	753				
zaw	379				
zic	586	zic	586	muj	835
muj	835	muj	835	zic	586
tep	298	tep	298	tep	298

Trial 30 (Reading)

Whole		Pure Part		Progressive Part	
zoq	614				
mev	921				
tus	467				
tib	753				
zaw	379				
mog	142				
muj	835	muj	835	zic	586
tep	298	tep	298	tep	298
zic	586	zic	586	muj	835

Test List

Whole		Pure Part		Progressive Part	
mev	______				
zoq	______				
tus	______				
zaw	______				
tib	______				
mog	______				
tep	______	tep	______	tep	______
muj	______	muj	______	muj	______
zic	______	zic	______	zic	______

Trial 31 (Reading)

Whole		**Pure Part**		**Progressive Part**	
zoq	614	zoq	614		
tus	467	tus	467		
mev	921	mev	921		
tib	753	tib	753		
mog	142	mog	142		
zaw	379	zaw	379		
muj	835	muj	835	muj	835
sic	586	sic	586	sic	586
tep	298	tep	298	tep	298

Trial 32 (Reading)

Whole		**Pure Part**		**Progressive Part**	
tus	467	tus	467		
mev	921	mev	921		
zoq	614	zoq	614		
mog	142	mog	142		
zaw	379	zaw	379		
tib	753	tib	753		
sic	586	sic	586	muj	835
tep	298	tep	298	tep	298
muj	835	muj	835	sic	586

Trial 33 (Reading)

Whole		**Pure Part**		**Progressive Part**	
mev	921	mev	921		
zoq	614	zoq	614		
tus	467	tus	467		
zaw	379	zaw	379		
tib	753	tib	753		
mog	142	mog	142		
tep	298	tep	298	tep	298
muj	835	muj	835	sic	586
sic	586	sic	586	muj	835

Trial 34 (Reading)

Whole		Pure Part		Progressive Part	
zoq	614	zoq	614		
tus	467	tus	467		
mev	921	mev	921		
tib	753	tib	753		
mog	142	mog	142		
zaw	379	zaw	379		
muj	835	muj	835	zic	586
zic	586	zic	586	muj	835
tep	298	tep	298	tep	298

Trial 35 (Reading)

Whole		Pure Part		Progressive Part	
tus	467	tus	467		
mev	921	mev	921		
zoq	614	zoq	614		
mog	142	mog	142		
zaw	379	zaw	379		
tib	753	tib	753		
zic	586	zic	586	muj	835
tep	298	tep	298	tep	298
muj	835	muj	835	zic	586

Trial 36 (Reading)

Whole		Pure Part		Progressive Part	
zoq	614	zoq	614	zoq	614
tus	467	tus	467	tus	467
mev	921	mev	921	mev	921
tib	753	tib	753	tib	753
mog	142	mog	142	mog	142
zaw	379	zaw	379	zaw	379
muj	835	muj	835	muj	835
zic	586	zic	586	zic	586
tep	298	tep	298	tep	298

Trial 37 (Reading)

Whole		Pure Part		Progressive Part	
zoq	614	zoq	614	zoq	614
mev	921	mev	921	mev	921
tus	467	tus	467	tus	467
tib	753	tib	753	tib	753
zaw	379	zaw	379	zaw	379
mog	142	mog	142	mog	142
muj	835	muj	835	muj	835
tep	298	tep	298	tep	298
zic	586	zic	586	zic	586

Trial 38 (Reading)

Whole		Pure Part		Progressive Part	
mev	921	mev	921	mev	921
tus	467	tus	467	tus	467
zoq	614	zoq	614	zoq	614
zaw	379	zaw	379	zaw	379
mog	142	mog	142	mog	142
tib	753	tib	753	tib	753
tep	298	tep	298	tep	298
zic	586	zic	586	zic	586
muj	835	muj	835	muj	835

Trial 39 (Reading)

Whole		Pure Part		Progressive Part	
tus	467	tus	467	tus	467
zoq	614	zoq	614	zoq	614
mev	921	mev	921	mev	921
mog	142	mog	142	mog	142
tib	753	tib	753	tib	753
zaw	379	zaw	379	zaw	379
zic	586	zic	586	zic	586
muj	835	muj	835	muj	835
tep	298	tep	298	tep	298

Trial 40 (Reading)

Whole		**Pure Part**		**Progressive Part**	
zoq	614	zoq	614	zoq	614
mev	921	mev	921	mev	921
tus	467	tus	467	tus	467
tib	753	tib	753	tib	753
zaw	379	zaw	379	zaw	379
mog	142	mog	142	mog	142
muj	835	muj	835	muj	835
tep	298	tep	298	tep	298
zic	586	zic	586	zic	586

Test List

Whole		**Pure Part**		**Progressive Part**	
mev	_____	mev	_____	mev	_____
zoq	_____	zoq	_____	zoq	_____
tus	_____	tus	_____	tus	_____
zaw	_____	zaw	_____	zaw	_____
tib	_____	tib	_____	tib	_____
mog	_____	mog	_____	mog	_____
tep	_____	tep	_____	tep	_____
muj	_____	muj	_____	muj	_____
zic	_____	zic	_____	zic	_____

Non-logical II

Trial 1 (Reading)

Whole		Pure Part		Progressive Part	
yux	853	yux	853	yux	853
koj	947	koj	947	koj	947
daq	274	daq	274	daq	274
kel	728				
dos	589				
yem	136				
dut	412				
yik	691				
kag	365				

Trial 2 (Recitation)

Whole

koj ______
daq ______
yux ______
dos ______
yem ______
kel ______
yik ______
kag ______
dut ______

Pure Part

koj ______
daq ______
yux ______

Progressive Part

koj ______
daq ______
yux ______

Trial 3 (Recitation)

Whole

daq ______
yux ______
koj ______
yem ______
kel ______
dos ______
kag ______
dut ______
yik ______

Pure Part

daq ______
yux ______
koj ______

Progressive Part

daq ______
yux ______
koj ______

Trial 4 (Recitation)

Whole	**Pure Part**	**Progressive Part**
yux ______	yux ______	yux ______
koj ______	koj ______	koj ______
daq ______	daq ______	daq ______
kel ______		
dos ______		
yem ______		
dut ______		
yik ______		
kag ______		

Trial 5 (Recitation)

Whole	**Pure Part**	**Progressive Part**
koj ______	koj ______	koj ______
daq ______	daq ______	daq ______
yux ______	yux ______	yux ______
dos ______		
yem ______		
kel ______		
yik ______		
kag ______		
dut ______		

Trial 6 (Reading)

Whole		**Pure Part**		**Progressive Part**	
yux	853	yux	853	yux	853
koj	947	koj	947	koj	947
daq	274	daq	274	daq	274
kel	728				
dos	589				
yem	136				
dut	412				
yik	691				
kag	365				

Trial 7 (Recitation)

Whole	Pure Part	Progressive Part
yux ______	yux ______	yux ______
daq ______	daq ______	daq ______
koj ______	koj ______	koj ______
kel ______		
yem ______		
dos ______		
dut ______		
kag ______		
yik ______		

Trial 8 (Recitation)

Whole	Pure Part	Progressive Part
daq ______	daq ______	daq ______
koj ______	koj ______	koj ______
yux ______	yux ______	yux ______
yem ______		
dos ______		
kel ______		
kag ______		
yik ______		
dut ______		

Trial 9 (Recitation)

Whole	Pure Part	Progressive Part
koj ______	koj ______	koj ______
yux ______	yux ______	yux ______
daq ______	daq ______	daq ______
dos ______		
kel ______		
yem ______		
yik ______		
dut ______		
kag ______		

Trial 10 (Recitation)

Whole

yux ______
daq ______
koj ______
kel ______
yem ______
dos ______
dut ______
kag ______
yik ______

Pure Part

yux ______
daq ______
koj ______

Progressive Part

yux ______
daq ______
koj ______

Test List

Whole

daq ______
yux ______
koj ______
yem ______
kel ______
dos ______
kag ______
dut ______
yik ______

Pure Part

daq ______
yux ______
koj ______

Progressive Part

daq ______
yux ______
koj ______

Trial 11 (Reading)

Whole

yux	853
koj	947
daq	274
kel	728
dos	589
yem	136
dut	412
yik	691
kag	365

Pure Part

kel	728
dos	589
yem	136

Progressive Part

kel	728
dos	589
yem	136

Trial 12 (Recitation)

Whole

koj ________
daq ________
yux ________
dos ________
yem ________
kel ________
yik ________
kag ________
dut ________

Pure Part

dos ________
yem ________
kel ________

Progressive Part

dos ________
yem ________
kel ________

Trial 13 (Recitation)

Whole

daq ________
yux ________
koj ________
yem ________
kel ________
dos ________
kag ________
dut ________
yik ________

Pure Part

yem ________
kel ________
dos ________

Progressive Part

yem ________
kel ________
dos ________

Trial 14 (Recitation)

Whole

yux ________
koj ________
daq ________
kel ________
dos ________
yem ________
dut ________
yik ________
kag ________

Pure Part

kel ________
dos ________
yem ________

Progressive Part

kel ________
dos ________
yem ________

Trial 15 (Recitation)

Whole

koj ______
daq ______
yux ______
dos ______
yem ______
kel ______
yik ______
kag ______
dut ______

Pure Part

dos ______
yem ______
kel ______

Progressive Part

dos ______
yem ______
kel ______

Trial 16 (Reading)

Whole

yux	853
koj	947
daq	274
kel	728
dos	589
yem	136
dut	412
yik	691
kag	365

Pure Part

kel	728
dos	589
yem	136

Progressive Part

kel	728
dos	589
yem	136

Trial 17 (Recitation)

Whole

yux ______
daq ______
koj ______
kel ______
yem ______
dos ______
dut ______
kag ______
yik ______

Pure Part

kel ______
yem ______
dos ______

Progressive Part

kel ______
yem ______
dos ______

Trial 18 (Recitation)

Whole	Pure Part	Progressive Part
daq ______		
koj ______		
yux ______		
yen ______	yen ______	yen ______
dos ______	dos ______	dos ______
kel ______	kel ______	kel ______
kag ______		
yik ______		
dut ______		

Trial 19 (Recitation)

Whole	Pure Part	Progressive Part
koj ______		
yux ______		
daq ______		
dos ______	dos ______	dos ______
kel ______	kel ______	kel ______
yen ______	yen ______	yen ______
yik ______		
dut ______		
kag ______		

Trial 20 (Recitation)

Whole	Pure Part	Progressive Part
yux ______		
daq ______		
koj ______		
kel ______	kel ______	kel ______
yen ______	yen ______	yen ______
dos ______	dos ______	dos ______
dut ______		
kag ______		
yik ______		

Test List

Whole	**Pure Part**	**Progressive Part**
daq ______		
yux ______		
koj ______		
yem ______	yem ______	yem ______
kel ______	kel ______	kel ______
dos ______	dos ______	dos ______
kag ______		
dut ______		
yik ______		

Trial 21 (Reading)

Whole	**Pure Part**	**Progressive Part**
yux 853		yux 853
koj 947		koj 947
daq 274		daq 274
kel 728		kel 728
dos 509		dos 509
yem 136		yem 136
dut 412	dut 412	
yik 691	yik 691	
kag 365	kag 365	

Trial 22 (Recitation)

Whole	**Pure Part**	**Progressive Part**
koj ______		koj ______
daq ______		daq ______
yux ______		yux ______
dos ______		dos ______
yem ______		yem ______
kel ______		kel ______
yik ______	yik ______	
kag ______	kag ______	
dut ______	dut ______	

Trial 23 (Recitation)

Whole	Pure Part	Progressive Part
daq ______		daq ______
yux ______		yux ______
koj ______		koj ______
yem ______		yem ______
kel ______		kel ______
dos ______		dos ______
kag ______	kag ______	
dut ______	dut ______	
yik ______	yik ______	

Trial 24 (Recitation)

Whole	Pure Part	Progressive Part
yux ______		yux ______
koj ______		koj ______
daq ______		daq ______
kel ______		kel ______
dos ______		dos ______
yem ______		yem ______
dut ______	dut ______	
yik ______	yik ______	
kag ______	kag ______	

Trial 25 (Recitation)

Whole	Pure Part	Progressive Part
koj ______		koj ______
daq ______		daq ______
yux ______		yux ______
dos ______		dos ______
yem ______		yem ______
kel ______		kel ______
yik ______	yik ______	
kag ______	kag ______	
dut ______	dut ______	

Trial 26 (Reading)

Whole		**Pure Part**		**Progressive Part**	
yux	833				
koj	947				
daq	274				
kel	728				
dos	589				
yem	136				
dut	412	dut	412	dut	412
yik	691	yik	691	yik	691
kag	363	kag	363	kag	363

Trial 27 (Recitation)

Whole		**Pure Part**		**Progressive Part**	
yux	______				
daq	______				
koj	______				
kel	______				
yem	______				
dos	______				
dut	______	dut	______	yik	______
kag	______	kag	______	kag	______
yik	______	yik	______	dut	______

Trial 28 (Recitation)

Whole		**Pure Part**		**Progressive Part**	
daq	______				
koj	______				
yux	______				
yem	______				
dos	______				
kel	______				
kag	______	kag	______	kag	______
yik	______	yik	______	dut	______
dut	______	dut	______	yik	______

Trial 29 (Recitation)

Whole	Pure Part	Progressive Part
koj ________		
yux ________		
daq ________		
dos ________		
kel ________		
yem ________		
yik ________	yik ______	dut ______
dut ________	dut ______	yik ______
kag ________	kag ______	kag ______

Trial 30 (Recitation)

Whole	Pure Part	Progressive Part
yux ________		
daq ________		
koj ________		
kel ________		
yem ________		
dos ________		
dut ________	dut ______	yik ______
kag ________	kag ______	kag ______
yik ________	yik ______	dut ______

Test List

Whole	Pure Part	Progressive Part
daq ________		
yux ________		
koj ________		
yem ________		
kel ________		
dos ________		
kag ________	kag ______	kag ______
dut ________	dut ______	dut ______
yik ________	yik ______	yik ______

Trial 31 (Reading)

Whole		Pure Part		Progressive Part	
yux	853	yux	853		
koj	947	koj	947		
daq	274	daq	274		
kel	728	kel	728		
dos	589	dos	589		
yem	136	yem	136		
dut	412	dut	412	dut	412
yik	691	yik	691	yik	691
kag	365	kag	365	kag	365

Trial 32 (Recitation)

Whole		Pure Part		Progressive Part	
koj	______	koj	______		
daq	______	daq	______		
yux	______	yux	______		
dos	______	dos	______		
yem	______	yem	______		
kel	______	kel	______		
yi	______	yik	______	dut	______
kag	______	kag	______	kag	______
dut	______	dut	______	yik	______.

Trial 33 (Recitation)

Whole		Pure Part		Progressive Part	
daq	______	daq	______		
yux	______	yux	______		
koj	______	koj	______		
yem	______	yem	______		
kel	______	kel	______		
dos	______	dos	______		
kag	______	kag	______	kag	______
dut	______	dut	______	yik	______
yik	______	yik	______	dut	______

Trial 34 (Recitation)

Whole		**Pure Part**		**Progressive Part**	
yux	______	yux	______		
koj	______	koj	______		
daq	______	daq	______		
kel	______	kel	______		
dos	______	dos	______		
yem	______	yem	______		
dut	______	dut	______	yik	______
yik	______	yik	______	dut	______
kag	______	kag	______	kag	______

Trial 35 (Recitation)

Whole		**Pure Part**		**Progressive Part**	
koj	______	koj	______		
daq	______	daq	______		
yux	______	yux	______		
dos	______	dos	______		
yem	______	yem	______		
kel	______	kel	______		
yik	______	yik	______	dut	______
kag	______	kag	______	kag	______
dut	______	dut	______	yik	______

Trial 36 (Reading)

Whole		**Pure Part**		**Progressive Part**	
yux	853	yux	853	yux	853
koj	947	koj	947	koj	947
daq	274	daq	274	daq	274
kel	728	kel	728	kel	728
dos	589	dos	589	dos	589
yem	136	yem	136	yem	136
dut	412	dut	412	dut	412
yik	691	yik	691	yik	691
kag	365	kag	365	kag	365

Trial 37 (Recitation)

Whole	**Pure Part**	**Progressive Part**
yux ________	yux ________	yux ________
daq ________	daq ________	daq ________
koj ________	koj ________	koj ________
kel ________	kel ________	kel ________
yem ________	yem ________	yem ________
dos ________	dos ________	dos ________
dut ________	dut ________	dut ________
kag ________	kag ________	kag ________
yik ________	yik ________	yik ________

Trial 38 (Recitation)

Whole	**Pure Part**	**Progressive Part**
daq ________	daq ________	daq ________
koj ________	koj ________	koj ________
yux ________	yux ________	yux ________
yem ________	yem ________	yem ________
dos ________	dos ________	dos ________
kel ________	kel ________	kel ________
kag ________	kag ________	kag ________
yik ________	yik ________	yik ________
dut ________	dut ________	dut ________

Trial 39 (Recitation)

Whole	**Pure Part**	**Progressive Part**
koj ________	koj ________	koj ________
yux ________	yux ________	yux ________
daq ________	daq ________	daq ________
dos ________	dos ________	dos ________
kel ________	kel ________	kel ________
yem ________	yem ________	yem ________
yik ________	yik ________	yik ________
dut ________	dut ________	dut ________
kag ________	kag ________	kag ________

Trial 40 (Recitation)

Whole	Pure Part	Progressive Part
yux ________	yux ________	yux ________
daq ________	daq ________	daq ________
koj ________	koj ________	koj ________
kel ________	kel ________	kel ________
yem ________	yem ________	yem ________
dos ________	dos ________	dos ________
dut ________	dut ________	dut ________
kag ________	kag ________	kag ________
yik ________	yik ________	yik ________

Test List

Whole	Pure Part	Progressive Part
daq ________	daq ________	daq ________
yux ________	yux ________	yux ________
koj ________	koj ________	koj ________
yem ________	yem ________	yem ________
kel ________	kel ________	kel ________
dos ________	dos ________	dos ________
kag ________	kag ________	kag ________
dut ________	dut ________	dut ________
yik ________	yik ________	yik ________

Non-logical III

Trial 1 (Reading)

Whole	Pure Part	Progressive Part
vul 382	vul 382	vul 382
hif 521	hif 521	hif 521
bap 139	bap 139	bap 139
hud 986		
bim 463		
ven 425		
bov 754		
vah 617		
heb 268		

Trial 2 (Recitation)

Whole	Pure Part	Progressive Part
hif ______	hif ______	hif ______
bap ______	bap ______	bap ______
vul ______	vul ______	vul ______
bim ______		
ven ______		
hud ______		
vah ______		
heb ______		
bov ______		

Trial 3 (Recitation)

Whole	Pure Part	Progressive Part
bap ______	bap ______	bap ______
vul ______	vul ______	vul ______
hif ______	hif ______	hif ______
ven ______		
hud ______		
bim ______		
heb ______		
bov ______		
vah ______		

Trial 4 (Recitation)

Whole

vul ______
hif ______
bap ______
hud ______
bim ______
ven ______
bov ______
vah ______
heb ______

Pure Part

vul ______
hif ______
bap ______

Progressive Part

vul ______
hif ______
bap ______

Trial 5 (Recitation)

Whole

hif ______
bap ______
vul ______
bim ______
ven ______
hud ______
vah ______
heb ______
bov ______

Pure Part

hif ______
bap ______
vul ______

Progressive Part

hif ______
bap ______
vul ______

Trial 6 (Reading)

Whole

vul	382
hif	521
bap	139
hud	986
bim	463
ven	425
bov	754
vah	617
heb	268

Pure Part

vul	382
hif	521
bap	139

Progressive Part

vul	382
hif	521
bap	139

Trial 7 (Recitation)

Whole	Pure Part	Progressive Part
vul ______	vul ______	vul ______
bap ______	bap ______	bap ______
hif ______	hif ______	hif ______
hud ______		
ven ______		
bim ______		
bov ______		
heb ______		
vah ______		

Trial 8 (Recitation)

Whole	Pure Part	Progressive Part
bap ______	bap ______	bap ______
hif ______	hif ______	hif ______
vul ______	vul ______	vul ______
ven ______		
bim ______		
hud ______		
heb ______		
vah ______		
bov ______		

Trial 9 (Recitation)

Whole	Pure Part	Progressive Part
hif ______	hif ______	hif ______
vul ______	vul ______	vul ______
bap ______	bap ______	bap ______
bim ______		
hud ______		
ven ______		
vah ______		
bov ______		
heb ______		

Trial 10 (Recitation)

Whole	Pure Part	Progressive Part
vul ______	vul ______	vul ______
bap ______	bap ______	bap ______
hif ______	hif ______	hif ______
hud ______		
ven ______		
bim ______		
bov ______		
heb ______		
vah ______		

Test List

Whole	Pure Part	Progressive Part
bap ______	bap ______	bap ______
vul ______	vul ______	vul ______
hif ______	hif ______	hif ______
ven ______		
hud ______		
bim ______		
heb ______		
bov ______		
vah ______		

Trial 11 (Reading)

Whole		Pure Part		Progressive Part	
vul	382				
hif	521				
bap	139				
hud	986	hud	986	hud	986
bim	463	bim	463	bim	463
ven	425	ven	425	ven	425
bov	754				
vah	617				
heb	268				

Trial 12 (Recitation)

Whole	Pure Part	Progressive Part
hif ______		
bap ______		
vul ______		
bim ______	bim ______	bim ______
ven ______	ven ______	ven ______
hud ______	hud ______	hud ______
vah ______		
heb ______		
bov ______		

Trial 13 (Recitation)

Whole	Pure Part	Progressive Part
bap ______		
vul ______		
hif ______		
ven ______	ven ______	ven ______
hud ______	hud ______	hud ______
bim ______	bim ______	bim ______
heb ______		
bov ______		
vah ______		

Trial 14 (Recitation)

Whole	Pure Part	Progressive Part
vul ______		
hif ______		
bap ______		
hud ______	hud ______	hud ______
bim ______	bim ______	bim ______
ven ______	ven ______	ven ______
bov ______		
vah ______		
heb ______		

Trial 15 (Recitation)

Whole		**Pure Part**		**Progressive Part**	
hif	______				
bap	______				
vul	______				
bim	______	bim	______	bim	______
ven	______	ven	______	ven	______
hud	______	hud	______	hud	______
vah	______				
heb	______				
bov	______				

Trial 16 (Reading)

Whole		**Pure Part**		**Progressive Part**	
vul	382				
hif	521				
bap	139				
hud	986	hud	986	hud	986
bim	463	bim	463	bim	463
vem	425	vem	425	vem	425
bov	754				
vah	617				
heb	268				

Trial 17 (Recitation)

Whole		**Pure Part**		**Progressive Part**	
vul	______				
bap	______				
hif	______				
hud	______	hud	______	hud	______
ven	______	ven	______	ven	______
bim	______	bim	______	bim	______
bov	______				
heb	______				
vah	______				

Trial 18 (Recitation)

Whole	**Pure Part**	**Progressive Part**
bap ______		
hif ______		
vul ______		
ven ______	ven ______	ven ______
bim ______	bim ______	bim ______
hud ______	hud ______	hud ______
heb ______		
vah ______		
bov ______		

Trial 19 (Recitation)

Whole	**Pure Part**	**Progressive Part**
hif ______		
vul ______		
bap ______		
bim ______	bim ______	bim ______
hud ______	hud ______	hud ______
ven ______	ven ______	ven ______
vah ______		
bov ______		
heb ______		

Trial 20 (Recitation)

Whole	**Pure Part**	**Progressive Part**
vul ______		
bap ______		
hif ______		
hud ______	hud ______	hud ______
ven ______	ven ______	ven ______
bim ______	bim ______	bim ______
bov ______		
heb ______		
vah ______		

Test List

Whole	Pure Part	Progressive Part
bap ______		
vul ______		
hif ______		
ven ______	ven ______	ven ______
hud ______	hud ______	hud ______
bim ______	bim ______	bim ______
heb ______		
bov ______		
vah ______		

Trial 21 (Reading)

Whole	Pure Part	Progressive Part
vul 382		vul 382
hif 521		hif 521
bap 139		bap 139
hud 986		hud 986
bim 463		bim 463
ven 425		ven 425
bov 754	bov 754	
vah 617	vah 617	
heb 268	heb 268	

Trial 22 (Recitation)

Whole	Pure Part	Progressive Part
hif ______		hif ______
bap ______		bap ______
vul ______		vul ______
bim ______		bim ______
ven ______		ven ______
hud ______		hud ______
vah ______	vah ______	
heb ______	heb ______	
bov ______	bov ______	

Trial 23 (Recitation)

Whole	**Pure Part**	**Progressive Part**
bap ______		bap ______
vul ______		vul ______
hif ______		hif ______
ven ______		ven ______
hud ______		hud ______
bim ______		bim ______
heb ______	heb ______	
bov ______	bov ______	
vah ______	vah ______	

Trial 24 (Recitation)

Whole	**Pure Part**	**Progressive Part**
vul ______		vul ______
hif ______		hif ______
bap ______		bap ______
hud ______		hud ______
bim ______		bim ______
ven ______		ven ______
bov ______	bov ______	
vah ______	vah ______	
heb ______	heb ______	

Trial 25 (Recitation)

Whole	**Pure Part**	**Progressive Part**
hif ______		hif ______
bap ______		bap ______
vul ______		vul ______
bim ______		bim ______
ven ______		ven ______
hud ______		hud ______
vah ______	vah ______	
heb ______	heb ______	
bov ______	bov ______	

Trial 26 (Reading)

Whole		Pure Part		Progressive Part	
vul	302				
hif	521				
bap	139				
hud	906				
bim	463				
ven	425				
bov	754	bov	754	bov	754
vah	617	vah	617	vah	617
heb	268	heb	268	heb	268

Trial 27 (Recitation)

Whole		Pure Part		Progressive Part	
vul	______				
bap	______				
hif	______				
hud	______				
ven	______				
bim	______				
bov	______	bov	______	vah	______
heb	______	heb	______	heb	______
vah	______	vah	______	bov	______

Trial 28 (Recitation)

Whole		Pure Part		Progressive Part	
bap	______				
hif	______				
vul	______				
ven	______				
bim	______				
hud	______				
heb	______	heb	______	heb	______
vah	______	vah	______	bov	______
bov	______	bov	______	vah	______

Trial 29 (Recitation)

Whole	**Pure Part**	**Progressive Part**
hif ______		
vul ______		
bap ______		
bim ______		
hud ______		
ven ______		
vah ______	vah ______	bov ______
bov ______	bov ______	vah ______
heb ______	heb ______	heb ______

Trial 30 (Recitation)

Whole	**Pure Part**	**Progressive Part**
vul ______		
bap ______		
hif ______		
hud ______		
ven ______		
bim ______		
bov ______	bov ______	vah ______
heb ______	heb ______	heb ______
vah ______	vah ______	bov ______

Test List

Whole	**Pure Part**	**Progressive Part**
bap ______		
vul ______		
hif ______		
ven ______		
hud ______		
bim ______		
heb ______	heb ______	heb ______
bov ______	bov ______	bov ______
vah ______	vah ______	vah ______

Trial 31 (Reading)

Whole		Pure Part		Progressive Part	
vul	382	vul	382		
hif	521	hif	521		
bap	139	bap	139		
hud	986	hud	986		
bim	463	bim	463		
ven	425	ven	425		
bov	754	bov	754	bov	754
vah	617	vah	617	vah	617
heb	268	heb	268	heb	268

Trial 32 (Recitation)

Whole		Pure Part		Progressive Part	
hif		hif			
bap		bap			
vul		vul			
bim		bim			
ven		ven			
hud		hud			
vah		vah		bov	
heb		heb		heb	
bov		bov		vah	

Trial 33 (Recitation)

Whole		Pure Part		Progressive Part	
bap		bap			
vul		vul			
hif		hif			
ven		ven			
hud		hud			
bim		bim			
heb		heb		heb	
bov		bov		vah	
vah		vah		bov	

Trial 34 (Recitation)

Whole		Pure Part		Progressive Part	
vul	____	vul	____		
hif	____	hif	____		
bap	____	bap	____		
hud	____	hud	____		
bim	____	bim	____		
ven	____	ven	____		
bov	____	bov	____	vah	____
vah	____	vah	____	bov	____
heb	____	heb	____	heb	____

Trial 35 (Recitation)

Whole		Pure Part		Progressive Part	
hif	____	hif	____		
bap	____	bap	____		
vul	____	vul	____		
bim	____	bim	____		
ven	____	ven	____		
hud	____	hud	____		
vah	____	vah	____	bov	____
heb	____	heb	____	heb	____
bov	____	bov	____	vah	____

Trial 36 (Reading)

Whole		Pure Part		Progressive Part	
vul	382	vul	382	vul	382
hif	521	hif	521	hif	521
bap	139	bap	139	bap	139
hud	986	hud	986	hud	986
bim	463	bim	463	bim	463
ven	425	ven	425	ven	425
bov	754	bov	754	bov	754
vah	617	vah	617	vah	617
heb	268	heb	268	heb	268

Trial 37 (Recitation)

Whole	**Pure Part**	**Progressive Part**
vul ______	vul ______	vul ______
bap ______	bap ______	bap ______
hif ______	hif ______	hif ______
hud ______	hud ______	hud ______
ven ______	ven ______	ven ______
bim ______	bim ______	bim ______
bov ______	bov ______	bov ______
heb ______	heb ______	heb ______
vah ______	vah ______	vah ______

Trial 38 (Recitation)

Whole	**Pure Part**	**Progressive Part**
bap ______	bap ______	bap ______
hif ______	hif ______	hif ______
vul ______	vul ______	vul ______
ven ______	ven ______	ven ______
bim ______	bim ______	bim ______
hud ______	hud ______	hud ______
heb ______	heb ______	heb ______
vah ______	vah ______	vah ______
bov ______	bov ______	bov ______

Trial 39 (Recitation)

Whole	**Pure Part**	**Progressive Part**
hif ______	hif ______	hif ______
vul ______	vul ______	vul ______
bap ______	bap ______	bap ______
bim ______	bim ______	bim ______
hud ______	hud ______	hud ______
ven ______	ven ______	ven ______
vah ______	vah ______	vah ______
bov ______	bov ______	bov ______
heb ______	heb ______	heb ______

Trial 40 (Recitation)

Whole	Pure Part	Progressive Part
vul ______	vul ______	vul ______
bap ______	bap ______	bap ______
hif ______	hif ______	hif ______
hud ______	hud ______	hud ______
ven ______	ven ______	ven ______
bim ______	bim ______	bim ______
bov ______	bov ______	bov ______
heb ______	heb ______	heb ______
vah ______	vah ______	vah ______

Test List

Whole	Pure Part	Progressive Part
bap ______	bap ______	bap ______
vul ______	vul ______	vul ______
hif ______	hif ______	hif ______
ven ______	ven ______	ven ______
hud ______	hud ______	hud ______
bim ______	bim ______	bim ______
heb ______	heb ______	heb ______
bov ______	bov ______	bov ______
vah ______	vah ______	vah ______

Non-logical IV

Trial 1 (Reading)

Whole		Pure Part		Progressive Part	
wup	692	wup	692	wup	692
piv	325	piv	325	piv	325
jad	538	jad	538	jad	538
pof	249				
jix	943				
wec	164				
juk	721				
wog	457				
pej	816				

Trial 2 (Recitation)

Whole		Pure Part		Progressive Part	
piv	______	piv	______	piv	______
jad	______	jad	______	jad	______
wup	______	wup	______	wup	______
jix	______				
wec	______				
pof	______				
wog	______				
pej	______				
juk	______				

Trial 3 (Recitation)

Whole		Pure Part		Progressive Part	
jad	______	jad	______	jad	______
wup	______	wup	______	wup	______
piv	______	piv	______	piv	______
wec	______				
pof	______				
jix	______				
pej	______				
juk	______				
wog	______				

Trial 4 (Recitation)

Whole	**Pure Part**	**Progressive Part**
wup ______	wup ______	wup ______
piv ______	piv ______	piv ______
jad ______	jad ______	jad ______
pof ______		
jix ______		
wec ______		
juk ______		
wog ______		
pej ______		

Trial 5 (Recitation)

Whole	**Pure Part**	**Progressive Part**
piv ______	piv ______	piv ______
jad ______	jad ______	jad ______
wup ______	wup ______	wup ______
jix ______		
wec ______		
pof ______		
wog ______		
pej ______		
juk ______		

Trial 6 (Reading)

Whole		**Pure Part**		**Progressive Part**	
wup	692	wup	692	wup	692
piv	325	piv	325	piv	325
jad	538	jad	538	jad	538
pof	249				
jix	943				
wec	164				
juk	721				
wog	457				
pej	816				

Trial 7 (Recitation)

Whole	Pure Part	Progressive Part
wup ______	wup ______	wup ______
jad ______	jad ______	jad ______
piv ______	piv ______	piv ______
pof ______		
wec ______		
jix ______		
juk ______		
pej ______		
wog ______		

Trial 8 (Recitation)

Whole	Pure Part	Progressive Part
jad ______	jad ______	jad ______
piv ______	piv ______	piv ______
wup ______	wup ______	wup ______
wec ______		
jix ______		
pof ______		
pej ______		
wog ______		
juk ______		

Trial 9 (Recitation)

Whole	Pure Part	Progressive Part
piv ______	piv ______	piv ______
wup ______	wup ______	wup ______
jad ______	jad ______	jad ______
jix ______		
pof ______		
wec ______		
wog ______		
juk ______		
pej ______		

Trial 10 (Recitation)

Whole	Pure Part	Progressive Part
wup ______	wup ______	wup ______
jad ______	jad ______	jad ______
piv ______	piv ______	piv ______
pof ______		
wec ______		
jix ______		
juk ______		
pej ______		
wog ______		

Test List

Whole	Pure Part	Progressive Part
jad ______	jad ______	jad ______
wup ______	wup ______	wup ______
piv ______	piv ______	piv ______
wec ______		
pof ______		
jix ______		
pej ______		
juk ______		
wog ______		

Trial 11 (Reading)

Whole		Pure Part		Progressive Part	
wup	692				
piv	325				
jad	538				
pof	249	pof	249	pof	249
jix	943	jix	943	jix	943
wec	164	wec	164	wec	164
juk	721				
wog	457				
pej	816				

Trial 12 (Recitation)

Whole	**Pure Part**	**Progressive Part**
piv ______		
jad ______		
wup ______		
jix ______	jix ______	jix ______
wec ______	wec ______	wec ______
pof ______	pof ______	pof ______
wog ______		
pej ______		
juk ______		

Trial 13 (Recitation)

Whole	**Pure Part**	**Progressive Part**
jad ______		
wup ______		
piv ______		
wec ______	wec ______	wec ______
pof ______	pof ______	pof ______
jix ______	jix ______	jix ______
pej ______		
juk ______		
wog ______		

Trial 14 (Recitation)

Whole	**Pure Part**	**Progressive Part**
wup ______		
piv ______		
jad ______		
pof ______	pof ______	pof ______
jix ______	jix ______	jix ______
wec ______	wec ______	wec ______
juk ______		
wog ______		
pej ______		

Trial 15 (Recitation)

Whole		Pure Part		Progressive Part	
piv	______				
jad	______				
wup	______				
jix	______	jix	______	jix	______
wec	______	wec	______	wec	______
pof	______	pof	______	pof	______
wog	______				
pej	______				
juk	______				

Trial 16 (Reading)

Whole		Pure Part		Progressive Part	
wup	692				
piv	325				
jad	538				
pof	249	pof	249	pof	249
jix	943	jix	943	jix	943
wec	164	wec	164	wec	164
juk	721				
wog	457				
pej	816				

Trial 17 (Recitation)

Whole		Pure Part		Progressive Part	
wup	______				
jad	______				
piv	______				
pof	______	pof	______	pof	______
wec	______	wec	______	wec	______
jix	______	jix	______	jix	______
juk	______				
pej	______				
wog	______				

Trial 18 (Recitation)

Whole	**Pure Part**	**Progressive Part**
jad ______		
piv ______		
wup ______		
wec ______	wec ______	wec ______
jix ______	jix ______	jix ______
pof ______	pof ______	pof ______
pej ______		
wog ______		
juk ______		

Trial 19 (Recitation)

Whole	**Pure Part**	**Progressive Part**
piv ______		
wup ______		
jad ______		
jix ______	jix ______	jix ______
pof ______	pof ______	pof ______
wec ______	wec ______	wec ______
wog ______		
juk ______		
pej ______		

Trial 20 (Recitation)

Whole	**Pure Part**	**Progressive Part**
wup ______		
jad ______		
piv ______		
pof ______	pof ______	pof ______
wec ______	wec ______	wec ______
jix ______	jix ______	jix ______
juk ______		
pej ______		
wog ______		

Test List

Whole	Pure Part	Progressive Part
jad ______		
wup ______		
piv ______		
wec ______	wec ______	wec ______
pof ______	pof ______	pof ______
jix ______	jix ______	jix ______
pej ______		
juk ______		
wog ______		

Trial 21 (Reading)

Whole	Pure Part	Progressive Part
wup 692		wup 692
piv 325		piv 325
jad 538		jad 538
pof 249		pof 249
jix 943		jix 943
wec 164		wec 164
juk 721	juk 721	
wog 457	wog 457	
pej 816	pej 816	

Trial 22 (Recitation)

Whole	Pure Part	Progressive Part
piv ______		piv ______
jad ______		jad ______
wup ______		wup ______
jix ______		jix ______
wec ______		wec ______
pof ______		pof ______
wog ______	wog ______	
pej ______	pej ______	
juk ______	juk ______	

Trial 23 (Recitation)

Whole	Pure Part	Progressive Part
jad ______		jad ______
wup ______		wup ______
piv ______		piv ______
wec ______		wec ______
pof ______		pof ______
jix ______		jix ______
pej ______	pej ______	
juk ______	juk ______	
wog ______	wog ______	

Trial 24 (Recitation)

Whole	Pure Part	Progressive Part
wup ______		wup ______
piv ______		piv ______
jad ______		jad ______
pof ______		pof ______
jix ______		jix ______
wec ______		wec ______
juk ______	juk ______	
wog ______	wog ______	
pej ______	pej ______	

Trial 25 (Recitation)

Whole	Pure Part	Progressive Part
piv ______		piv ______
jad ______		jad ______
wup ______		wup ______
jix ______		jix ______
wec ______		wec ______
pof ______		pof ______
wog ______	wog ______	
pej ______	pej ______	
juk ______	juk ______	

Trial 26 (Reading)

Whole	Pure Part	Progressive Part
wup 692		
piv 325		
jad 538		
pof 249		
jix 943		
wec 164		
juk 721	juk 721	juk 721
wog 457	wog 457	wog 457
pej 816	pej 816	pej 816

Trial 27 (Recitation)

Whole	Pure Part	Progressive Part
wup ______		
jad ______		
piv ______		
pof ______		
wec ______		
jix ______		
juk ______	juk ______	wog ______
pej ______	pej ______	pej ______
wog ______	wog ______	juk ______

Trial 28 (Recitation)

Whole	Pure Part	Progressive Part
jad ______		
piv ______		
wup ______		
wec ______		
jix ______		
pof ______		
pej ______	pej ______	pej ______
wog ______	wog ______	juk ______
juk ______	juk ______	wog ______

Trial 29 (Recitation)

Whole	Pure Part	Progressive Part
piv ______		
wup ______		
jad ______		
jix ______		
pof ______		
wec ______		
wog ______	wog ______	juk ______
juk ______	juk ______	wog ______
pej ______	pej ______	pej ______

Trial 30 (Recitation)

Whole	Pure Part	Progressive Part
wup ______		
jad ______		
piv ______		
pof ______		
wec ______		
jix ______		
juk ______	juk ______	wog ______
pej ______	pej ______	pej ______
wog ______	wog ______	juk ______

Test List

Whole	Pure Part	Progressive Part
jad ______		
wup ______		
piv ______		
wec ______		
pof ______		
jix ______		
pej ______	pej ______	pej ______
juk ______	juk ______	juk ______
wog ______	wog ______	wog ______

Trial 31 (Reading)

Whole	Pure Part	Progressive Part
wup 692	wup 692	
piv 325	piv 325	
jad 538	jad 538	
pof 249	pof 249	
jix 943	jix 943	
wec 164	wec 164	
juk 721	juk 721	juk 721
wog 457	wog 457	wog 457
pej 816	pej 816	pej 816

Trial 32 (Recitation)

Whole	Pure Part	Progressive Part
piv ______	piv ______	
jad ______	jad ______	
wup ______	wup ______	
jix ______	jix ______	
wec ______	wec ______	
pof ______	pof ______	
wog ______	wog ______	juk ______
pej ______	pej ______	pej ______
juk ______	juk ______	wog ______

Trial 33 (Recitation)

Whole	Pure Part	Progressive Part
jad ______	jad ______	
wup ______	wup ______	
piv ______	piv ______	
wec ______	wec ______	
pof ______	pof ______	
jix ______	jix ______	
pej ______	pej ______	pej ______
juk ______	juk ______	wog ______
wog ______	wog ______	juk ______

Trial 34 (Recitation)

Whole	Pure Part	Progressive Part
wup ______	wup ______	
piv ______	piv ______	
jad ______	jad ______	
pof ______	pof ______	
jix ______	jix ______	
wec ______	wec ______	
juk ______	juk ______	wog ______
wog ______	wog ______	juk ______
pej ______	pej ______	pej ______

Trial 35 (Recitation)

Whole	Pure Part	Progressive Part
piv ______	piv ______	
jad ______	jad ______	
wup ______	wup ______	
jix ______	jix ______	
wec ______	wec ______	
pof ______	pof ______	
wog ______	wog ______	juk ______
pej ______	pej ______	pej ______
juk ______	juk ______	wog ______

Trial 36 (Reading)

Whole	Pure Part	Progressive Part
wup 692	wup 692	wup 692
piv 325	piv 325	piv 325
jad 538	jad 538	jad 538
pof 249	pof 249	pof 249
jix 943	jix 943	jix 943
wec 164	wec 164	wec 164
juk 721	juk 721	juk 721
wog 457	wog 457	wog 457
pej 816	pej 816	pej 816

Trial 37 (Recitation)

Whole	Pure Part	Progressive Part
wup ______	wup ______	wup ______
jad ______	jad ______	jad ______
piv ______	piv ______	piv ______
pof ______	pof ______	pof ______
wec ______	wec ______	wec ______
jix ______	jix ______	jix ______
juk ______	juk ______	juk ______
pej ______	pej ______	pej ______
wog ______	wog ______	wog ______

Trial 38 (Recitation)

Whole	Pure Part	Progressive Part
jad ______	jad ______	jad ______
piv ______	piv ______	piv ______
wup ______	wup ______	wup ______
wec ______	wec ______	wec ______
jix ______	jix ______	jix ______
pof ______	pof ______	pof ______
pej ______	pej ______	pej ______
wog ______	wog ______	wog ______
juk ______	juk ______	juk ______

Trial 39 (Recitation)

Whole	Pure Part	Progressive Part
piv ______	piv ______	piv ______
wup ______	wup ______	wup ______
jad ______	jad ______	jad ______
jix ______	jix ______	jix ______
pof ______	pof ______	pof ______
wec ______	wec ______	wec ______
wog ______	wog ______	wog ______
juk ______	juk ______	juk ______
pej ______	pej ______	pej ______

Trial 40 (Recitation)

Whole	**Pure Part**	**Progressive Part**
wup ______	wup ______	wup ______
jad ______	jad ______	jad ______
piv ______	piv ______	piv ______
pof ______	pof ______	pof ______
wec ______	wec ______	wec ______
jix ______	jix ______	jix ______
juk ______	juk ______	juk ______
pej ______	pej ______	pej ______
wog ______	wog ______	wog ______

Test List

Whole	**Pure Part**	**Progressive Part**
jad ______	jad ______	jad ______
wup ______	wup ______	wup ______
piv ______	piv ______	piv ______
wec ______	wec ______	wec ______
pof ______	pof ______	pof ______
jix ______	jix ______	jix ______
pej ______	pej ______	pej ______
juk ______	juk ______	juk ______
wog ______	wog ______	wog ______

APPENDIX D

PRIMARY STATISTICAL DATA: SOURCE TABLES

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Source Table 1

Means (Rounded): Comparisons of the Six B Groups (Practice and Task Variants Held Constant)

Variant	Level of Practice (A)			
	A1	A2	A3	A4
B1	0.80884	0.9697	0.9980	1.1606
B2	0.7515	0.9336	0.9939	1.0988
B3	0.7534	0.9668	1.0266	1.1758
B4	0.9403	1.2375	1.2752	1.6936
B5	0.9386	1.2627	1.3431	1.8298
B6	1.0909	1.4815	1.5346	2.3211

Source Table 2

Results of Analyses of Variance Among Means: Comparisons of the Six B Groups (Practice and Task Variants Held Constant)

Source	df	Mean Square A1	Mean Square A3	Mean Square A3	Mean Square A4
Total	2303	0.1540	0.1945	0.1936	0.6204
Groups	5	12.0778***	18.5147***	19.2854***	90.9109***
B in Groups	30	0.4189***	0.4834***	0.4119***	1.6624***
Error	2268	0.1242	0.1503	0.1486	0.4075

*** P < .001

Source Table 3

Results of the Multiple Range Tests of Differences Between Pairs of Means: Comparisons of the Six B Groups (Practice and Task Variants Held Constant)

Vari-	Level of Practice	Comparison	Critical Difference P=.05	Critical Difference P=.01	Results
B	A1	B2:B3	0.0471	0.0619	B2=B3
		B2:B1	0.0496	0.0646	B2<B1*
		B2:B5	0.0513	0.0663	B2<B5**
		B2:B4	0.0525	0.0677	B2<B4**
		B2:B6	0.0536	0.0687	B2<B6**
		B3:B1	0.0471	0.0619	B3<B1*
		B3:B5	0.0496	0.0646	B3<B5**
		B3:B4	0.0513	0.0663	B3<B4**
		B3:B6	0.0525	0.0677	B3<B6**
		B1:B5	0.0471	0.0619	B1<B5**
		B1:B4	0.0496	0.0646	B1<B4**
		B1:B6	0.0513	0.0663	B1<B6**
		B5:B4	0.0471	0.0619	B5=B4
		B5:B6	0.0496	0.0646	B5<B6**
		B4:B6	0.0471	0.0619	B4<B6**
B	A2	B2:B3	0.0554	0.0728	B2=B3
		B2:B1	0.0584	0.0760	B2=B1
		B2:B4	0.0604	0.0780	B2<B4**
		B2:B5	0.0618	0.0796	B2<B5**
		B2:B6	0.0630	0.0808	B2<B6**
		B3:B1	0.0554	0.0728	B3=B1
		B3:B4	0.0584	0.0760	B3<B4**
		B3:B5	0.0604	0.0780	B3<B5**
		B3:B6	0.0618	0.0796	B3<B6**
		B1:B4	0.0554	0.0728	B1<B4**
		B1:B5	0.0584	0.0760	B1<B5**
		B1:B6	0.0604	0.0796	B1<B6**
		B4:B5	0.0554	0.0728	B4=B5
		B4:B6	0.0584	0.0760	B4<B6**
		B5:B6	0.0554	0.0728	B5<B6**

Source Table 3--(continued)

Variant	Level of Practice	Comparison	Critical Difference P=.05	Critical Difference P=.01	Results
B	A3	B2:B1	0.0554	0.0728	B2=B1
		B2:B3	0.0584	0.0760	B2=B3
		B2:B4	0.0604	0.0780	B2<B4**
		B2:B5	0.0618	0.0796	B2<B5**
		B2:B6	0.0630	0.0808	B2<B6**
		B1:B3	0.0554	0.0728	B1=B3
		B1:B4	0.0584	0.0760	B1<B4**
		B1:B5	0.0604	0.0780	B1<B5**
		B1:B6	0.0618	0.0796	B1<B6**
		B3:B4	0.0554	0.0728	B3<B4**
		B3:B5	0.0584	0.0760	B3<B5**
		B3:B6	0.0604	0.0780	B3<B6**
		B4:B5	0.0554	0.0728	B4<B5*
		B4:B6	0.0584	0.0760	B4<B6**
		B5:B6	0.0554	0.0728	B5<B6**
B	A4	B2:B1	0.0914	0.1201	B2=B1
		B2:B3	0.0964	0.1254	B2=B3
		B2:B4	0.0997	0.1287	B2<B4**
		B2:B5	0.1020	0.1313	B2<B5**
		B2:B6	0.1039	0.1333	B2<B6**
		B1:B3	0.0914	0.1201	B1=B3
		B1:B4	0.0964	0.1254	B1<B4**
		B1:B5	0.0997	0.1287	B1<B5**
		B1:B6	0.1020	0.1313	B1<B6**
		B3:B4	0.0914	0.1201	B3<B4**
		B3:B5	0.0964	0.1254	B3<B5**
		B3:B6	0.0997	0.1287	B3<B6**
		B4:B5	0.0914	0.1201	B4<B5**
		B4:B6	0.0964	0.1254	B4<B6**
		B5:B6	0.0914	0.1201	B5<B6**

* $P < .05$

** $P < .01$

Source Table 4

Means (Rounded): Comparisons Over All B Groups

Variable	Variant	Level of practice (A)			
		A1	A2	A3	A4
M	M1	1.1375	1.1474	1.1810	1.5218
	M2	1.1125	1.1228	1.2080	1.5332
R	R1	1.0295	1.0362	1.0673	1.2804
	R2	1.0643	1.0962	1.1723	1.4549
	R3	1.1600	1.1886	1.1680	1.5829
	R4	1.2462	1.2194	1.3704	1.7918
D	D1	0.8863	0.9850	1.1978	1.7430
	D2	1.2546	1.2083	1.2569	1.4393
	D3	1.2341	1.2120	1.1288	1.4002
C	C1	1.1226	1.1179	1.1931	1.5420
	C2	1.1274	1.1523	1.1959	1.5130
MR	M1R1	1.0052	1.0438	1.0270	1.2469
	M1R2	1.0841	1.1120	1.0976	1.4024
	M1R3	1.1283	1.2319	1.1617	1.5369
	M1R4	1.3324	1.2019	1.4377	1.9010
	M2R1	1.0538	1.0286	1.1076	1.3139
	M2R2	1.0445	1.0804	1.2470	1.5074
	M2R3	1.1917	1.1453	1.1743	1.6289
	M2R4	1.1600	1.2369	1.3031	1.6826
MD	M1D1	0.9150	1.0035	1.1505	1.7132
	M1D2	1.2682	1.2128	1.2630	1.4388
	M1D3	1.2293	1.2259	1.1295	1.4134
	M2D1	0.8576	0.9665	1.2451	1.7728
	M2D2	1.2410	1.2038	1.2508	1.4398
	M2D3	1.2389	1.1981	1.1281	1.3870

Source Table 4--(continued)

Variable	Variant	Level of practice (A)			
		A1	A2	A3	A4
MC	M1C1	1.1444	1.1274	1.1684	1.5370
	M1C2	1.1306	1.1674	1.1936	1.5066
	M2C1	1.1008	1.1084	1.2178	1.5470
	M2C2	1.1242	1.1372	1.1982	1.5194
RD	R1D1	0.8372	0.8997	1.0338	1.5426
	R1D2	1.1264	1.1150	1.1422	1.1870
	R1D3	1.1249	1.0939	1.0259	1.1116
	R2D1	0.8284	0.9468	1.2175	1.6401
	R2D2	1.1760	1.1670	1.2215	1.3704
	R2D3	1.1883	1.1748	1.0779	1.3542
	R3D1	0.9668	1.0365	1.1702	1.8060
	R3D2	1.2784	1.2623	1.2344	1.4768
	R3D3	1.2348	1.2670	1.0994	1.4659
	R4D1	0.9128	1.0570	1.3697	1.9833
	R4D2	1.4376	1.2889	1.4295	1.7230
	R4D3	1.3882	1.3123	1.3120	1.6691
RC	R1C1	1.0373	1.0197	1.0759	1.2924
	R1C2	1.0217	1.0527	1.0587	1.2684
	R2C1	1.0827	1.0879	1.1692	1.4627
	R2C2	1.0459	1.1045	1.1754	1.4471
	R3C1	1.1468	1.1621	1.1407	1.5677
	R3C2	1.1732	1.2151	1.1953	1.5981
	R4C1	1.2236	1.2019	1.3866	1.8452
	R4C2	1.2688	1.2369	1.3542	1.7384
DC	D1C1	0.8722	0.9653	1.2031	1.7446
	D1C2	0.9004	1.0047	1.1925	1.7414
	D2C1	1.2766	1.1838	1.2516	1.4741
	D2C2	1.2326	1.2328	1.2622	1.4045
	D3C1	1.2190	1.2046	1.1246	1.4073
	D3C2	1.2492	1.2194	1.1330	1.3931
S	S1	1.1235	1.1386	1.1941	1.5373
	S2	1.1265	1.1316	1.1949	1.5177

Source Table 5

Results of Analyses of Covariance Among Means: Comparisons Over All B Groups

Source	df	Mean Square A1	Mean Square A2	Mean Square A3	Mean Square A4
Total		0.2002	0.1927	0.1912	0.6114
Regression		6.0680	4.1219	5.3440	23.6634
Error		0.1254	0.1324	0.1281	0.3287
M	1	0.3448	0.3500	0.4178	0.0733
R	3	5.0795***	4.1111***	9.3183***	26.9074***
D	2	30.8921***	12.6673***	3.0603***	26.4145***
C	1	0.0129	0.6330*	0.0044	0.4484
MR	3	1.5385***	0.3879*	2.1110***	3.4075***
MD	2	0.2059	0.0314	0.5130*	0.2786
MC	1	0.1886	0.0132	0.2088	0.0007
RD	6	0.5952***	0.0274	0.1393	0.2162
RC	3	0.1901	0.0244	0.1894	0.3988
DC	2	0.3317	0.0594	0.0245	0.2266
S	1	0.0012	0.1100	0.0011	0.8670
MA	1	0.5869*	2.6382***	2.3687***	6.9143***
CA	1	32.2611***	29.4217***	30.5343***	171.4374***
IQ	1	18.6902***	21.8029***	252.3579***	120.9272***

* $P < .05$
*** $P < .001$

Source Table 6

Results of Kramer's Multiple Range Test of Differences Between Pairs of Means: Comparisons Over All B Groups

Variable	Level of Practice	Comparison	Weighted Difference	$z_{.05}$ S	$z_{.01}$ S	Results
R	A1	R1:R2	0.8257	0.9695	1.2740	R1=R2
		R1:R3	3.1293	1.0220	1.3300	R1<R3**
		R1:R4	4.9982	1.0570	1.3650	R1<R4**
		R2:R3	2.2748	0.9695	1.2740	R2<R3**
		R2:R4	4.1679	1.0220	1.3300	R2<R4**
		R3:R4	1.9901	0.9695	1.2740	R3<R4**
R	A2	R1:R2	1.4388	0.9972	1.3104	R1<R2**
		R1:R3	3.6703	1.0512	1.3680	R1<R3**
		R1:R4	4.4120	1.0872	1.4040	R1<R4**
		R2:R3	2.2060	0.9972	1.3104	R2<R3**
		R2:R4	2.9465	1.0512	1.3680	R2<R4**
		R3:R4	0.7379	0.9972	1.3104	R3=R4
R	A3	R1:R3	2.4252	0.9972	1.3104	R1<R3**
		R1:R2	2.5178	1.0512	1.3680	R1<R2**
		R1:R4	7.2996	1.0872	1.4040	R1<R4**
		R3:R2	0.1027	0.9972	1.3104	R3=R2
		R3:R4	4.8492	1.0512	1.3680	R3<R4**
		R2:R4	4.7337	0.9972	1.3104	R2<R4**
R	A4	R1:R2	4.1844	1.5789	2.0748	R1<R2**
		R1:R3	7.2852	1.6644	2.1660	R1<R3**
		R1:R4	12.3161	1.7214	2.2230	R1<R4**
		R2:R3	3.0560	1.5789	2.0748	R2<R3**
		R2:R4	8.0504	1.6644	2.1660	R2<R4**
		R3:R4	5.0049	1.5789	2.0748	R3<R4**

Source Table 6 --(continued)

Variable	Level of Practice	Comparison	Weighted Difference	$z_{.05}$ S	$z_{.01}$ S	Results
D	A1	D1:D3	9.3970	0.9695	1.2740	D1<D3**
		D1:D2	9.9236	1.0220	1.3300	D1<D2**
		D3:D2	0.5610	0.9695	1.2740	D3=D2
D	A2	D1:D2	6.0949	0.9972	1.3104	D1<D2**
		D1:D3	6.2208	1.0512	1.3680	D1<D3**
		D2:D3	0.1009	0.9972	1.3104	D2=D3
D	A3	D3:D1	1.8909	0.9972	1.3104	D3<D1**
		D3:D2	3.4941	1.0512	1.3680	D3<D2**
		D1:D2	1.6131	0.9972	1.3104	D1<D2**
D	A4	D3:D2	1.0665	1.5789	2.0748	D3=D2
		D3:D1	9.3942	1.6644	2.1660	D3<D1**
		D2:D1	8.2894	1.5789	2.0748	D2<D1**
C	A1	F non-significant; all means equivalent.				
C	A2	C1:C2	1.1231	0.9972	1.3104	C1<C2*
C	A3	F non-significant; all means equivalent.				
C	A4	F non-significant; all means equivalent.				

Source Table 6--(continued)

Variable	Level of Practice	Comparison	Weighted Difference	$z_{.05}S$	$z_{.01}S$	Results
		M2R4:M1R3	0.9766	0.9695	1.2740	M2R4<M1R3*
		M2R4:M1R1	1.2233	1.0220	1.3300	M2R4<M1R1*
		M2R4:M2R2	1.5214	1.0570	1.3650	M2R4<M2R2**
		M2R4:M1R2	2.6791	1.0815	1.3930	M2R4<M1R2**
		M2R4:M2R1	2.5463	1.1025	1.4140	M2R4<M2R1**
		M2R4:M2R3	2.7219	1.1165	1.4315	M2R4<M2R3**
		M2R4:M1R4	2.7259	1.1305	1.4490	M2R4<M1R4**
		M1R3:M1R1	0.1774	0.9695	1.2740	M1R3=M1R1
		M1R3:M2R2	1.2227	1.0220	1.3300	M1R3<M2R2*
		M1R3:M1R2	1.2241	1.0570	1.3650	M1R3<M1R2*
		M1R3:M2R1	2.6803	1.0815	1.3930	M1R3<M2R1**
		M1R3:M2R3	1.7187	1.1025	1.4140	M1R3<M2R3**
		M1R3:M1R4	2.7219	1.1165	1.4315	M1R3<M1R4**
MR	A1	M1R1:M2R2	0.9766	0.9695	1.2740	M1R1<M2R2*
		M1R1:M1R2	1.0473	1.0220	1.3300	M1R1<M1R2*
		M1R1:M2R1	1.4272	1.0570	1.3650	M1R1<M2R1**
		M1R1:M2R3	2.6803	1.0815	1.3930	M1R1<M2R3**
		M1R1:M1R4	2.5463	1.1025	1.4140	M1R1<M1R4**
		M2R2:M1R2	0.2801	0.9695	1.2740	M2R2=M1R2
		M2R2:M2R1	1.0473	1.0220	1.3300	M2R2<M2R1*
		M2R2:M2R3	1.2241	1.0570	1.3650	M2R2<M2R3*
		M2R2:M1R4	2.6791	1.0815	1.3930	M2R2<M1R4**
		M1R2:M2R1	0.9766	0.9695	1.2740	M1R2<M2R1*
		M1R2:M2R3	1.2227	1.0220	1.3300	M1R2<M2R3*
		M1R2:M1R4	1.5214	1.0570	1.3650	M1R2<M1R4**
		M2R1:M2R3	0.1774	0.9695	1.2740	M2R1=M2R3
		M2R1:M1R4	1.2233	1.0220	1.3300	M2R1<M1R4*
		M2R3:M1R4	0.9766	0.9695	1.2740	M2R3<M1R4*
		M2R3:M1R4	0.0407	0.9972	1.3104	M2R3=M1R4
		M2R3:M1R1	0.8923	1.0512	1.3680	M2R3=M1R1
		M2R3:M2R2	0.6566	1.0872	1.4040	M2R3=M2R2
		M2R3:M1R2	1.1699	1.1124	1.4328	M2R3<M1R2*
		M2R3:M2R1	0.8598	1.1340	1.4544	M2R3=M2R1
		M2R3:M2R4	1.4579	1.1484	1.4724	M2R3<M2R4*
		M2R3:M1R3	1.2134	1.1628	1.4904	M2R3<M1R3*
MR	A2	M1R4:M1R1	0.6050	0.9972	1.3104	M1R4=M1R1
		M1R4:M2R2	0.8919	1.0512	1.3680	M1R4=M2R2
		M1R4:M1R2	0.7957	1.0872	1.4040	M1R4=M1R2
		M1R4:M2R1	1.1694	1.1124	1.4328	M1R4<M2R1*
		M1R4:M2R4	1.1679	1.1340	1.4544	M1R4<M2R4*
		M1R4:M1R3	1.4579	1.1484	1.4724	M1R4<M1R3*
		M1R1:M2R2	0.0407	0.9972	1.3104	M1R1=M2R2
		M1R1:M1R2	0.1966	1.0512	1.3680	M1R1=M1R2
		M1R1:M2R1	0.1852	1.0872	1.4040	M1R1=M2R1

Source Table 6--(continued)

Variable	Level of Practice	Comparison	Weighted Difference	$Z_{.05}S$	$Z_{.01}S$	Results
MR	A2 (continued)	M1R1:M2R4	1.1694	1.1124	1.4328	M1R1<M2R4*
		M1R1:M1R3	0.8598	1.1340	1.4544	M1R1=M1R3
		M2R2:M1R2	0.1363	0.9972	1.3104	M2R2=M1R2
		M2R2:M2R1	0.1966	1.0512	1.3680	M2R2=M2R1
		M2R2:M2R4	0.7957	1.0872	1.4040	M2R2=M2R4
		M2R2:M1R3	1.1699	1.1124	1.4328	M2R2<M1R3*
		M1R2:M2R1	0.0407	0.9972	1.3104	M1R2=M2R1
		M1R2:M2R4	0.8919	1.0512	1.3680	M1R2=M2R4
		M1R2:M1R3	0.6566	1.0872	1.4040	M1R2=M1R3
		M2R1:M2R4	0.6050	0.9972	1.3104	M2R1=M2R4
		M2R1:M1R3	0.8923	1.0512	1.3680	M2R1=M1R3
		M2R4:M1R3	0.0407	0.9972	1.3104	M2R4=M1R3
MR	A3	M2R4:M1R2	0.6647	0.9972	1.3104	M2R4=M1R2
		M2R4:M1R1	1.8304	1.0512	1.3680	M2R4<M1R1**
		M2R4:M2R3	1.7649	1.0872	1.4040	M2R4<M2R3**
		M2R4:M1R3	2.9868	1.1124	1.4328	M2R4<M1R3**
		M2R4:M2R1	2.5936	1.1340	1.4544	M2R4<M2R1**
		M2R4:M2R2	3.3932	1.1484	1.4724	M2R4<M2R2**
		M2R4:M1R4	3.1667	1.1628	1.4904	M2R4<M1R4**
		M1R2:M1R1	0.8249	0.9972	1.3104	M1R2=M1R1
		M1R2:M2R3	1.8312	1.0512	1.3680	M1R2<M2R3**
		M1R2:M1R3	1.6330	1.0872	1.4040	M1R2<M1R3**
		M1R2:M2R1	2.9855	1.1124	1.4328	M1R2<M2R1**
		M1R2:M2R2	2.3829	1.1340	1.4544	M1R2<M2R2**
		M1R2:M1R4	3.3932	1.1484	1.4724	M1R2<M1R4**
		M1R1:M2R3	0.6650	0.9972	1.3104	M1R1=M2R3
		M1R1:M1R3	0.8188	1.0512	1.3680	M1R1=M1R3
		M1R1:M2R1	1.0558	1.0872	1.4040	M1R1=M2R1
		M1R1:M2R2	2.9855	1.1124	1.4328	M1R1<M2R2**
		M1R1:M1R4	2.5936	1.1340	1.4544	M1R1<M1R4**
		M2R3:M1R3	0.2818	0.9972	1.3104	M2R3=M1R3
		M2R3:M2R1	0.8188	1.0512	1.3680	M2R3=M2R1
		M2R3:M2R2	1.6330	1.0872	1.4040	M2R3<M2R2**
		M2R3:M1R4	2.9868	1.1124	1.4328	M2R3<M1R4**
		M1R3:M2R1	0.6650	0.9972	1.3104	M1R3=M2R1
		M1R3:M2R2	1.8312	1.0512	1.3680	M1R3<M2R2**
		M1R3:M1R4	1.7649	1.0872	1.4040	M1R3<M1R4**
		M2R1:M2R2	0.8249	0.9972	1.3104	M2R1=M2R2
		M2R1:M1R4	1.8304	1.0512	1.3680	M2R1<M1R4**
		M2R2:M1R4	0.6647	0.9972	1.3104	M2R2=M1R4

Source Table 6—(continued)

Variable	Level of Practice	Comparison	Weighted Difference	$Z_{.05}S$	$Z_{.01}S$	Results
MR	A4	M2R4:M1R2	2.3094	1.5789	2.0748	M2R4<M1R2**
		M2R4:M1R3	2.5320	1.6644	2.1660	M2R4<M1R3**
		M2R4:M1R1	2.9524	1.7214	2.2230	M2R4<M1R1**
		M2R4:M2R1	3.4396	1.7613	2.2686	M2R4<M2R1**
		M2R4:M2R3	3.7216	1.7955	2.3028	M2R4<M2R3**
		M2R4:M2R2	3.8639	1.8183	2.3313	M2R4<M2R2**
		M2R4:M1R4	4.5031	1.8411	2.3598	M2R4<M1R4**
		M1R2:M1R3	0.1552	1.5789	2.0748	M1R2=M1R3
		M1R2:M1R1	0.4556	1.6644	2.1660	M1R2=M1R1
		M1R2:M2R1	2.5309	1.7214	2.2230	M1R2<M2R1**
		M1R1:M2R3	2.9537	1.7613	2.2686	M1R2<M2R3**
		M1R2:M2R2	1.8222	1.7955	2.3028	M1R2<M2R2*
		M1R2:M1R4	3.8639	1.8183	2.3313	M1R2<M1R4**
		M1R3:M1R1	0.3010	1.5789	2.0748	M1R3=M1R1
		M1R3:M2R1	2.3104	1.6644	2.1660	M1R3<M2R1**
		M1R3:M2R3	1.5774	1.7214	2.2230	M1R3=M2R3
		M1R3:M2R2	2.9537	1.7613	2.2686	M1R3<M2R2**
		M1R3:M1R4	3.7216	1.7955	2.3028	M1R3<M1R4**
		M1R1:M2R1	1.0952	1.5789	2.0748	M1R1=M2R1
		M1R1:M2R3	2.3104	1.6644	2.1660	M1R1<M2R3**
		M1R1:M2R2	2.5309	1.7214	2.2230	M1R1<M2R2**
		M1R1:M1R4	3.4396	1.7613	2.2686	M1R1<M1R4**
		M2R1:M2R3	0.3010	1.5789	2.0748	M2R1=M2R3
		M2R1:M2R2	0.4556	1.6644	2.1660	M2R1=M2R2
		M2R1:M1R4	2.9524	1.7214	2.2230	M2R1<M1R4**
		M2R3:M2R2	0.1552	1.5789	2.0748	M2R3=M2R2
		M2R3:M1R4	2.5320	1.6644	2.1660	M2R3<M1R4**
		M2R2:M1R4	2.3094	1.5789	2.0748	M2R2<M1R4**
MD	A1	F non-significant; all means equivalent.				
MD	A2	F non-significant; all means equivalent.				
MD	A3	M1D1:M2D2	0.5910	0.9972	1.3104	M1D1=M2D2
		M1D1:M2D3	0.8467	1.0512	1.3680	M1D1=M2D3
		M1D1:M1D3	1.1450	1.0872	1.4040	M1D1<M1D3*
		M1D1:M1D2	1.3221	1.1124	1.4328	M1D1<M1D2*
		M1D1:M2D1	1.4180	1.1340	1.4544	M1D1<M2D1*
		M2D2:M2D3	0.1325	0.9972	1.3104	M2D2=M2D3
		M2D2:M1D3	1.4176	1.0512	1.3680	M2D2<M1D3**
		M2D2:M1D2	0.8462	1.0872	1.4040	M2D2=M1D2
		M2D2:M2D1	1.3221	1.1124	1.4328	M2D2<M2D1**
		M2D3:M1D3	0.5910	0.9972	1.3104	M2D3=M1D3
		M2D3:M1D2	1.4176	1.0512	1.3680	M2D3<M1D2**
		M2D3:M2D1	1.1450	1.0872	1.4040	M2D3<M2D1*

Source Table 6—(continued)

Variable	Level of Practice	Comparison	Weighted Difference	$Z_{.05}S$	$Z_{.01}S$	Results
MD	A3 (continued)	M1D3:M1D2	0.1325	0.9972	1.3104	M1D3=M1D2
		M1D3:M2D1	0.8467	1.0512	1.3680	M1D3=M2D1
		M1D2:M2D1	0.3516	0.9972	1.3104	M1D2=M2D1
MD	A4	F non-significant; all means equivalent.				
		R4D1:R3D3	1.2452	0.9695	1.2740	R4D1<R3D3*
		R4D1:R1D2	1.2827	1.0220	1.3300	R4D1<R1D2*
		R4D1:R2D2	1.5926	1.0570	1.3650	R4D1<R2D2**
		R4D1:R1D3	1.6640	1.0815	1.3930	R4D1<R1D3**
		R4D1:R3D2	1.7315	1.1025	1.4140	R4D1<R3D2**
		R4D1:R2D1	1.5508	1.1165	1.4315	R4D1<R2D1**
		R4D1:R2D3	2.2636	1.1305	1.4490	R4D1<R2D3**
		R4D1:R4D3	1.9267	1.1410	1.4595	R4D1<R4D3**
		R4D1:R3D1	2.2607	1.1515	1.4700	R4D1<R3D1**
		R4D1:R1D1	2.2795	1.1585	1.4875	R4D1<R1D1**
		R4D1:R4D2	2.3318	1.1690	1.4910	R4D1<R4D2**
		R3D3:R1D2	0.0341	0.9695	1.2740	R3D3=R1D2
		R3D3:R2D2	0.3475	1.0220	1.3300	R3D3=R2D2
		R3D3:R1D3	0.3484	1.0570	1.3650	R3D3=R1D3
		R3D3:R3D2	0.3682	1.0815	1.3930	R3D3=R3D2
		R3D3:R2D1	0.7817	1.1025	1.4140	R3D3=R2D1
		R3D3:R2D3	0.8310	1.1165	1.4315	R3D3=R2D3
		R3D3:R4D3	1.1184	1.1305	1.4490	R3D3=R4D3
		R3D3:R3D1	1.2643	1.1410	1.4595	R3D3<R3D1*
		R3D3:R1D1	1.7062	1.1515	1.4700	R3D3<R1D1**
RD	A1	R3D3:R4D2	1.9951	1.1585	1.4875	R3D3<R4D2**
		R1D2:R2D2	0.2490	0.9695	1.2740	R1D2=R2D2
		R1D2:R1D3	0.3004	1.0220	1.3300	R1D2=R1D3
		R1D2:R3D2	0.3636	1.0570	1.3650	R1D2=R3D2
		R1D2:R2D1	0.7396	1.0815	1.3930	R1D2=R2D1
		R1D2:R2D3	1.0117	1.1025	1.4140	R1D2=R2D3
		R1D2:R4D3	1.3745	1.1165	1.4315	R1D2<R4D3*
		R1D2:R3D1	1.6403	1.1305	1.4490	R1D2<R3D1**
		R1D2:R1D1	1.2557	1.1410	1.4595	R1D2<R1D1*
		R1D2:R4D2	1.5499	1.1515	1.4700	R1D2<R4D2**
		R2D2:R1D3	0.0891	0.9695	1.2740	R2D2=R1D3
		R2D2:R3D2	0.1131	1.0220	1.3300	R2D2=R3D2
		R2D2:R2D1	0.3233	1.0570	1.3650	R2D2=R2D1
		R2D2:R2D3	0.5228	1.0815	1.3930	R2D2=R2D3
		R2D2:R4D3	1.0595	1.1025	1.4140	R2D2=R4D3
		R2D2:R3D1	1.3374	1.1165	1.4315	R2D2<R3D1*
		R2D2:R1D1	1.3579	1.1305	1.4490	R2D2<R1D1*
		R2D2:R4D2	1.3047	1.1410	1.4595	R2D2<R4D2*
		R1D3:R3D2	0.0533	0.9695	1.2740	R1D1=R3D2
		R1D3:R2D1	0.3457	1.0220	1.3300	R1D3=R2D1

Source Table 6--(continued)

Variable	Level of Practice	Comparison	Weighted Difference	$z_{.05}S$	$z_{.01}S$	Results
RD	A1 (continued)	R1D3:R2D3	0.4828	1.0570	1.3650	R1D3=R2D3
		R1D3:R4D3	0.7728	1.0815	1.3930	R1D3=R4D3
		R1D3:R3D1	1.2446	1.1025	1.4140	R1D3<R3D1*
		R1D3:R1D1	0.9541	1.1165	1.4315	R1D3=R1D1
		R1D3:R4D2	1.5692	1.1305	1.4490	R1D3<R4D2**
		R3D2:R2D1	0.2933	0.9695	1.2740	R3D2=R2D1
		R3D2:R2D3	0.5554	1.0220	1.3300	R3D2=R2D3
		R3D2:R4D3	0.9240	1.0570	1.3650	R3D2=R4D3
		R3D2:R3D1	0.8983	1.0815	1.3930	R3D2=R3D1
		R3D2:R1D1	1.2151	1.1025	1.4140	R3D2<R1D1*
		R3D2:R4D2	1.2017	1.1165	1.4315	R3D2<R4D2*
		R2D1:R2D3	0.1913	0.9695	1.2740	R2D1=R2D3
		R2D1:R4D3	0.6392	1.0220	1.3300	R2D1=R4D3
		R2D1:R3D1	0.7132	1.0570	1.3650	R2D1=R3D1
		R2D1:R1D1	0.7309	1.0815	1.3930	R2D1=R1D1
		R2D1:R4D2	1.2474	1.1025	1.4140	R2D1<R4D2*
		R2D3:R4D3	0.2936	0.9695	1.2740	R2D3=R4D3
		R2D3:R3D1	0.6427	1.0220	1.3300	R2D3=R3D1
		R2D3:R1D1	0.6625	1.0570	1.3650	R2D3=R1D1
		R2D3:R4D2	0.9627	1.0815	1.3930	R2D3=R4D2
		R4D3:R3D1	0.2664	0.9695	1.2740	R4D3=R3D1
		R4D3:R1D1	0.2861	1.0220	1.3300	R4D3=R1D1
		R4D3:R4D2	0.4505	1.0570	1.3650	R4D3=R4D2
		R3D1:R1D1	0.0153	0.9695	1.2740	R3D1=R1D1
		R3D1:R4D2	0.3442	1.0220	1.3300	R3D1=R4D2
		R1D1:R4D2	0.3256	0.9695	1.2740	R1D1=R4D2
RD	A2	F non-significant; all means equivalent.				
RD	A3	F non-significant; all means equivalent.				
RD	A4	F non-significant; all means equivalent.				

* $P < .05$
** $P < .01$

Source Table 7

Means (Rounded): Comparisons Within the B1 Group

Variable	Variant	Level of practice (A)			
		A1	A2	A3	A4
M	M1	0.9414	0.9634	1.0149	1.1872
	M2	0.7866	0.9804	0.9969	1.1676
R	R1	0.8871	0.9009	0.9008	0.9834
	R2	0.8563	0.9454	0.9927	1.1703
	R3	0.8441	1.0142	0.9743	1.1907
	R4	0.8685	1.0271	1.1558	1.3652
D	D1	0.6039	0.8274	0.9821	1.3227
	D2	0.9740	1.0456	1.0388	1.0949
	D3	1.0141	1.0427	0.9968	1.1146
C	C1	0.8901	0.9554	1.0063	1.2462
	C2	0.8379	0.9884	1.0055	1.1086
MR	M1R1	1.0058	0.8933	0.9051	0.9772
	M1R2	0.8976	0.9207	0.9515	1.0762
	M1R3	0.7807	0.9902	1.0005	1.2397
	M1R4	1.0969	1.0494	1.2025	1.4557
	M2R1	0.7684	0.9085	0.8965	0.9896
	M2R2	0.8304	0.9701	1.0339	1.2644
	M2R3	0.9075	1.0382	0.9481	1.1417
	M2R4	0.9421	1.0048	1.1091	1.2747
MD	M1D1	0.7425	0.8520	0.9645	1.3493
	M1D2	1.0701	1.0104	1.0929	1.1717
	M1D3	1.0116	1.0278	0.9873	1.0406
	M2D1	0.4653	0.8028	0.9997	1.2961
	M2D2	0.8779	1.0808	0.9847	1.0181
	M2D3	1.0166	1.0576	1.0063	1.1886
MC	M1C1	0.9893	0.9757	1.0290	1.2901
	M1C2	0.8935	0.9511	1.0008	1.0843
	M2C1	0.7909	0.9351	0.9836	1.2023
	M2C2	0.7823	1.0257	1.0102	1.1329

Source Table 7--(continued)

Variable - Variant		Level of practice (A)			
		A1	A2	A3	A4
RD	R1D1	0.7884	0.8164	0.8992	1.0807
	R1D2	1.0151	0.9849	0.9503	0.8314
	R1D3	0.8578	0.9014	0.8529	1.0381
	R2D1	0.5905	0.7873	0.9770	1.3732
	R2D2	0.9607	0.9922	1.0751	1.1552
	R2D3	1.0177	1.0567	0.9260	0.9825
	R3D1	0.6892	0.8966	0.9513	1.3343
	R3D2	0.8399	1.0732	0.9827	1.1003
	R3D3	1.0032	1.0728	0.9889	1.1375
	R4D1	0.3475	0.8093	1.1009	1.5026
	R4D2	1.0803	1.1321	1.1471	1.2927
	R4D3	0.8189	1.1399	1.2194	1.3003
RC	R1C1	0.9179	0.8812	0.8865	1.0014
	R1C2	0.8563	0.9206	0.9151	0.9654
	R2C1	0.9071	0.9368	1.0190	1.2735
	R2C2	0.8055	0.9540	0.9664	1.0671
	R3C1	0.8104	0.9805	0.9165	1.1919
	R3C2	0.8778	1.0479	1.0321	1.1895
	R4C1	0.9250	1.0231	1.2032	1.5180
	R4C2	0.8120	1.0311	1.1084	1.2124
DC	D1C1	0.6652	0.8218	1.0046	1.3397
	D1C2	0.5426	0.8330	0.9596	1.3057
	D2C1	1.0168	0.9980	1.0287	1.1873
	D2C2	0.9312	1.0932	1.0489	1.0025
	D3C1	0.9883	1.0464	0.9856	1.2116
	D3C2	1.0399	1.0390	1.0080	1.0176
S	S1	0.8052	0.9902	1.0575	1.2620
	S2	0.9228	0.9536	0.9543	1.0928

Table 8

Results of Analyses of Covariance Among Means: Comparisons Within the B1 Group

Source	df	Mean Square A1	Mean Square A2	Mean Square A3	Mean Square A4
Total	376	0.1351	0.1325	0.1397	0.3158
Regression	28	0.6829	0.3578	0.4360	1.4847
Error	348	0.0919	0.1144	0.1159	0.2217
M	1	0.8558**	0.0271	0.0307	0.0357
R	3	0.0112	0.3318*	1.0855***	2.2883***
D	2	3.9131***	1.9657***	0.1079	1.9979***
C	1	0.1622	0.1019	0.0001	1.7761**
MR	3	0.7173***	0.0453	0.1332	0.3986*
MD	2	0.2457	0.1139	0.1898	0.7177*
MC	1	0.0849	0.3082	0.0693	0.4312
RD	6	0.3905***	0.0727	0.0899	0.1561
RC	3	0.0989	0.0159	0.1979	0.4688
DC	2	0.1775	0.0923	0.0457	0.2515
S	1	0.2121	0.1146	0.9144**	2.4622**
MA	1	--	0.0083	0.0161	0.2399
CA	1	0.2486	0.2009	0.0792	1.7614**
IQ	1	0.0350	0.0506	0.0086	0.6615

* P < .05
** P < .01
*** P < .001

Source Table 9

Results of Kramer's Multiple Range Test of Differences Between Pairs of Means: Comparisons Within the B1 Group

Variable	Level of Practice	Comparison	Weighted Difference	$Z_{.05}S$	$Z_{.01}S$	Results
M	A1	M1:M2	0.1432	0.8310	1.0920	M1=M2
M	A2	F non-significant; all means equivalent.				
M	A3	F non-significant; all means equivalent.				
M	A4	F non-significant; all means equivalent.				
R	A1	F non-significant; all means equivalent.				
R	A2	R1:R2	0.4291	0.9368	1.2310	R1=R2
		R1:R3	1.0926	0.9875	1.2852	R1<R3*
		R1:R4	1.2300	1.0214	1.3190	R1<R4*
		R2:R3	0.6635	0.9368	1.2310	R2=R3
		R2:R4	0.7963	0.9875	1.2852	R2=R4
		R3:R4	0.1257	0.9368	1.2310	R3=R4
R	A3	R1:R3	0.7088	0.9429	1.2391	R1=R3
		R1:R2	0.8863	0.9940	1.2935	R1=R2
		R1:R4	2.4854	1.0280	1.3276	R1<R4**
		R3:R2	0.1774	0.9429	1.2391	R3=R2
		R3:R4	1.7690	0.9940	1.2935	R3<R4**
		R2:R4	1.5897	0.9429	1.2391	R2<R4**
R	A4	R1:R2	1.8024	1.3041	1.7137	R1<R2**
		R1:R3	1.9991	1.3747	1.7890	R1<R3**
		R1:R4	3.7213	1.4218	1.8361	R1<R4**
		R2:R3	0.1967	1.3041	1.7137	R2=R3
		R2:R4	1.8997	1.3747	1.7890	R2<R4**
		R3:R4	1.7008	1.3041	1.7137	R3<R4*
D	A1	D1:D2	3.3103	0.8310	1.0920	D1<D2**
		D1:D3	3.5995	0.8760	1.1400	D1<D3**
		D2:D3	0.3653	0.8310	1.0920	D2=D3

Source Table 9--(continued)

Variable	Level of Practice	Comparison	Weighted Difference	$\underline{z}_{.05}S$	$\underline{z}_{.01}S$	Results
D	A2	D1:D3	2.4263	0.9368	1.2310	D1<D3**
		D1:D2	2.4395	0.9875	1.2852	D1<D2**
		D3:D2	0.0327	0.9368	1.2310	D3=D2
D	A3	F non-significant; all means equivalent.				
D	A4	D2:D3	0.2220	1.3041	1.7137	D2=D3
		D2:D1	2.5469	1.3747	1.7890	D2<D1**
		D3:D1	2.3452	1.3041	1.7137	D3<D1**
C	A1	F non-significant; all means equivalent.				
C	A2	F non-significant; all means equivalent.				
C	A3	F non-significant; all means equivalent.				
C	A4	C2:C1	1.8716	1.3041	1.7137	C2<C1**
MR	A1	M2R4:M1R3	0.0918	0.8310	1.0920	M2R4=M1R3
		M2R4:M1R2	0.8955	0.8760	1.1400	M2R4<M1R2*
		M2R4:M2R1	0.5805	0.9060	1.1700	M2R4=M2R1
		M2R4:M1R1	1.6984	0.9270	1.1940	M2R4<M1R1**
		M2R4:M2R2	1.5018	0.9450	1.2120	M2R4<M2R2**
		M2R4:M2R3	2.0005	0.9570	1.2270	M2R4<M2R3**
		M2R4:M1R4	1.5693	0.9690	1.2420	M2R4<M1R4**
		M1R3:M1R2	0.7525	0.8310	1.0920	M1R3=M1R2
		M1R3:M2R1	0.8955	0.8760	1.1400	M1R3<M2R1*
		M1R3:M1R1	1.0139	0.9060	1.1700	M1R3<M1R1*
		M1R3:M2R2	1.6984	0.9270	1.1940	M1R3<M2R2**
		M1R3:M2R3	1.6420	0.9450	1.2120	M1R3<M2R3**
		M1R3:M1R4	2.0005	0.9570	1.2270	M1R3<M1R4**
		M1R2:M2R1	0.0918	0.8310	1.0920	M1R2=M2R1
		M1R2:M1R1	0.5411	0.8760	1.1400	M1R2=M1R1
		M1R2:M2R2	0.6595	0.9060	1.1700	M1R2=M2R2
		M1R2:M2R3	1.6984	0.9270	1.1940	M1R2<M2R3**
		M1R2:M1R4	1.5018	0.9450	1.2120	M1R2<M1R4**
		M2R1:M1R1	0.3406	0.8310	1.0920	M2R1=M1R1
		M2R1:M2R2	0.5411	0.8760	1.1400	M2R1=M2R2
		M2R1:M2R3	1.0139	0.9060	1.1700	M2R1<M2R3*
		M2R1:M1R4	1.6984	0.9270	1.1940	M2R1<M1R4**

Source Table 9--(continued)

Variable	Level of Practice	Comparison	Weighted	$S_{.05}S$	$S_{.01}S$	Results
MR (continued)	A1	M1R1:M2R2	0.0918	0.8310	1.0920	M1R1=M2R2
		M1R1:M2R3	0.8955	0.8760	1.1400	M1R1<M2R3*
		M1R1:M1R4	0.5805	0.9060	1.1700	M1R1=M1R4
		M2R2:M2R3	0.7525	0.8310	1.0920	M2R2=M2R3
		M2R2:M1R4	0.8955	0.8760	1.1400	M2R2<M1R4*
		M2R3:M1R4	0.0918	0.8310	1.0920	M2R3=M1R4
MR	A2	F non-significant; all means equivalent.				
MR	A3	F non-significant; all means equivalent.				
MR	A4	M1R2:M2R4	0.3189	1.3041	1.7137	M1R2=M2R4
		M1R2:M2R3	0.8895	1.3747	1.7890	M1R2=M2R3
		M1R2:M1R1	0.8477	1.4218	1.8361	M1R2=M1R1
		M1R2:M2R1	1.6483	1.4548	1.8738	M1R2<M2R1*
		M1R2:M1R3	1.3800	1.4830	1.9020	M1R2=M1R3
		M1R2:M1R4	1.7993	1.5019	1.9256	M1R2<M1R4*
		M1R2:M2R2	1.6494	1.5207	1.9491	M1R2<M2R2*
		M2R4:M2R3	0.4045	1.3041	1.7137	M2R4=M2R3
		M2R4:M1R1	0.8895	1.3747	1.7890	M2R4=M1R1
		M2R4:M2R1	0.9425	1.4218	1.8361	M2R4=M2R1
		M2R4:M1R3	1.6483	1.4548	1.8738	M2R4<M1R3*
		M2R4:M1R4	1.2912	1.4830	1.9020	M2R4=M1R4
		M2R4:M2R2	1.7993	1.5019	1.9256	M2R4<M2R2*
		M2R3:M1R1	0.3189	1.3041	1.7137	M2R3=M1R1
		M2R3:M2R1	0.5323	1.3747	1.7890	M2R3=M2R1
		M2R3:M1R3	0.6223	1.4218	1.8361	M2R3=M1R3
		M2R3:M1R4	1.6483	1.4548	1.8738	M2R3<M1R4*
		M2R3:M2R2	1.3800	1.4830	1.9020	M2R3=M2R2
		M1R1:M2R1	0.2540	1.3041	1.7137	M1R1=M2R1
		M1R1:M1R3	0.5323	1.3747	1.7890	M1R1=M1R3
		M1R1:M1R4	0.9425	1.4218	1.8361	M1R1=M1R4
		M1R1:M2R2	1.6483	1.4548	1.8738	M1R1<M2R2*
		M2R1:M1R3	0.3189	1.3041	1.7137	M2R1=M1R3
		M2R1:M1R4	0.8895	1.3747	1.7890	M2R1=M1R4
		M2R1:M2R2	0.8477	1.4218	1.8361	M2R1=M2R2
		M1R3:M1R4	0.4045	1.3041	1.7137	M1R3=M1R4
		M1R3:M2R2	0.8895	1.3747	1.7890	M1R3=M2R2
		M1R4:M2R2	0.3189	1.3041	1.7137	M1R4=M2R2
MD	A1	F non-significant; all means equivalent.				
MD	A2	F non-significant; all means equivalent.				

Source Table 9--(continued)

Variable	Level of Practice	Comparison	Weighted Difference	$Z_{.05}^{S}$	$Z_{.01}^{S}$	Results
MD	A3	F non-significant; all means equivalent.				
MD	A4	M1D3:M2D2	0.3232	1.3041	1.7137	M1D3=M2D2
		M1D3:M2D1	1.2888	1.3747	1.7890	M1D3=M2D1
		M1D3:M1D1	1.1157	1.4218	1.8361	M1D3=M1D1
		M1D3:M1D2	1.6724	1.4548	1.8738	M1D3<M1D2*
		M1D3:M2D3	1.6163	1.4830	1.9020	M1D3<M2D3*
		M2D2:M2D1	0.5567	1.3041	1.7137	M2D2=M2D1
		M2D2:M1D1	1.6119	1.3747	1.7890	M2D2<M1D1*
		M2D2:M1D2	1.2923	1.4218	1.8361	M2D2=M1D2
		M2D2:M2D3	1.6724	1.4548	1.8738	M2D2<M2D3*
		M2D1:M1D1	0.3240	1.3041	1.7137	M2D1=M1D1
		M2D1:M1D2	1.6119	1.3747	1.7890	M2D1<M1D2*
		M2D1:M2D3	1.1157	1.4218	1.8361	M2D1=M2D3
		M1D1:M1D2	0.5567	1.3041	1.7137	M1D1=M1D2
		M1D1:M2D3	1.2888	1.3747	1.7890	M1D1=M2D3
		M1D2:M2D3	0.3232	1.3041	1.7137	M1D2=M2D3
RD	A1	R4D1:R1D3	0.4822	0.8310	1.0920	R4D1=R1D3
		R4D1:R3D2	0.8299	0.8760	1.1400	R4D1=R3D2
		R4D1:R2D1	1.2502	0.9060	1.1700	R4D1<R2D1**
		R4D1:R2D2	1.5943	0.9270	1.1940	R4D1<R2D2**
		R4D1:R3D3	1.4783	0.9450	1.2120	R4D1<R3D3**
		R4D1:R2D3	1.6999	0.9570	1.2270	R4D1<R2D3**
		R4D1:R1D2	1.6263	0.9690	1.2420	R4D1<R1D2**
		R4D1:R4D2	1.5388	0.9780	1.2510	R4D1<R4D2**
		R4D1:R3D1	1.8667	0.9870	1.2600	R4D1<R3D1**
		R4D1:R4D3	1.7317	0.9930	1.2690	R4D1<R4D3**
		R4D1:R1D1	1.5801	1.0020	1.2780	R4D1<R1D1**
		R1D3:R3D2	0.3966	0.8310	1.0920	R1D3=R3D2
		R1D3:R2D1	0.9671	0.8760	1.1400	R1D3<R2D1*
		R1D3:R2D2	1.0572	0.9060	1.1700	R1D3<R2D2*
		R1D3:R3D3	0.7993	0.9270	1.1940	R1D3=R3D3
		R1D3:R2D3	0.9724	0.9450	1.2120	R1D3<R2D3*
		R1D3:R1D2	0.7896	0.9570	1.2270	R1D3=R1D2
		R1D3:R4D2	1.5907	0.9690	1.2420	R1D3<R4D2**
		R1D3:R3D1	1.7773	0.9780	1.2510	R1D3<R3D1**
		R1D3:R4D3	1.3957	0.9870	1.2600	R1D3<R4D3**
		R1D3:R1D1	1.2752	0.9930	1.2690	R1D3<R1D1**
		R3D2:R2D1	0.7517	0.8310	1.0920	R3D2=R2D1
		R3D2:R2D2	0.6316	0.8760	1.1400	R3D2=R2D2
		R3D2:R3D3	0.6036	0.9060	1.1700	R3D2=R3D3
		R3D2:R2D3	0.9050	0.9270	1.1940	R3D2=R2D3
		R3D2:R1D2	0.6058	0.9450	1.2120	R3D2=R1D2
		R3D2:R4D2	1.2026	0.9570	1.2270	R3D2<R4D2*
		R3D2:R3D1	1.1400	0.9690	1.2420	R3D2<R3D1*
		R3D2:R4D3	1.7068	0.9780	1.2510	R3D2<R4D3**
		R3D2:R1D1	1.5832	0.9870	1.2600	R3D2<R1D1**

Source Table 9--(continued)

Vari-able	Level of Practice	Compari-son	Weighted Difference	$R_{.05}S$	$R_{.01}S$	Results
RD	A1 (continued)	R2D1:R2D2	0.0006	0.8310	1.0920	R2D1=R2D2
		R2D1:R3D3	0.1008	0.8760	1.1400	R2D1=R3D3
		R2D1:R2D3	0.0977	0.9060	1.1700	R2D1=R2D3
		R2D1:R1D2	0.1442	0.9270	1.1940	R2D1=R1D2
		R2D1:R4D2	0.7448	0.9450	1.2120	R2D1=R4D2
		R2D1:R3D1	0.6467	0.9570	1.2270	R2D1=R3D1
		R2D1:R4D3	1.1653	0.9690	1.2420	R2D1<R4D3*
		R2D1:R1D1	0.8520	0.9780	1.2510	R2D1=R1D1
		R2D2:R3D3	0.1012	0.8310	1.0920	R2D2=R3D3
		R2D2:R2D3	0.1656	0.8760	1.1400	R2D2=R2D3
		R2D2:R1D2	0.1226	0.9060	1.1700	R2D2=R1D2
		R2D2:R4D2	0.6262	0.9270	1.1940	R2D2=R4D2
		R2D2:R3D1	0.7835	0.9450	1.2120	R2D2=R3D1
		R2D2:R4D3	1.0417	0.9570	1.2270	R2D2<R4D3*
		R2D2:R1D1	0.9593	0.9690	1.2420	R2D2=R1D1
		R3D3:R2D3	0.0130	0.8310	1.0920	R3D3=R2D3
		R3D3:R1D2	0.0569	0.8760	1.1400	R3D3=R1D2
		R3D3:R4D2	0.5645	0.9060	1.1700	R3D3=R4D2
		R3D3:R3D1	0.4713	0.9270	1.1940	R3D3=R3D1
		R3D3:R4D3	0.8221	0.9450	1.2120	R3D3=R4D3
		R3D3:R1D1	0.9016	0.9570	1.2270	R3D3=R1D1
		R2D3:R1D2	0.0418	0.8310	1.0920	R2D3=R1D2
		R2D3:R4D2	0.6003	0.8760	1.1400	R2D3=R4D2
		R2D3:R3D1	0.6771	0.9060	1.1700	R2D3=R3D1
		R2D3:R4D3	0.8229	0.9270	1.1940	R2D3=R4D3
		R2D3:R1D1	0.8491	0.9450	1.2120	R2D3=R1D1
		R1D2:R4D2	0.3653	0.8310	1.0920	R1D2=R4D2
		R1D2:R3D1	[illegible]	0.8760	1.1400	R1D2=R3D1
		R1D2:R4D3	0.8106	0.9060	1.1700	R1D2=R4D3
		R1D2:R1D1	0.5554	0.9270	1.1940	R1D2=R1D1
		R4D2:R3D1	0.0220	0.8310	1.0920	R4D2=R3D1
		R4D2:R4D3	0.2865	0.8760	1.1400	R4D2=R4D3
		R4D2:R1D1	0.3722	0.9060	1.1700	R4D2=R1D1
		R3D1:R4D3	0.3234	0.8310	1.0920	R3D1=R4D3
		R3D1:R1D1	0.2450	0.8760	1.1400	R3D1=R1D1
		R4D3:R1D1	0.0147	0.8310	1.0920	R4D3=R1D1
RD	A2	F non-significant; all means equivalent.				
RD	A3	F non-significant; all means equivalent.				
RD	A4	F non-significant; all means equivalent.				

Source Table 9--(continued)

Vari-able	Level of Practice	Compari-son	Weighted Difference	$R_{.05}S$	$R_{.05}S$	Results
S	A1	F non-significant; all means equivalent.				
S	A2	F non-significant; all means equivalent.				
S	A3	S1:S2	1.3535	0.9429	1.2391	S2<S1**
S	A4	S2:S1	2.2190	1.3041	1.7137	S2<S1**

* $P < .05$
** $P < .01$
***$P < .001$

Source Table 10

Means (Rounded): Comparisons Within the B2 Group

Variable	Variant	Level of practice (A)			
		A1	A2	A3	A4
M	M1	1.5394	0.9098	0.9717	0.9804
	M2	1.5006	0.8724	1.0307	1.0208
R	R1	1.5010	0.7904	0.9166	0.8546
	R2	1.4067	0.8527	0.9375	0.9094
	R3	1.5350	0.9305	0.9550	0.9704
	R4	1.6365	0.9908	1.1957	1.2680
D	D1	1.3587	0.7362	0.9592	1.1128
	D2	1.5919	0.9371	1.0642	0.9244
	D3	1.6094	1.0000	0.9802	0.9646
C	C1	1.5458	0.8895	0.9987	1.0418
	C2	1.4942	0.8927	1.0037	0.9594
MR	M1R1	1.5350	0.8120	0.8503	0.8169
	M1R2	1.4138	0.8578	0.8510	0.8573
	M1R3	1.5384	0.9184	0.9231	0.9207
	M1R4	1.6704	1.0510	1.2624	1.3671
	M2R1	1.4670	0.7688	0.9829	0.8923
	M2R2	1.3996	0.8476	1.0240	1.0019
	M2R3	1.5332	0.9426	0.9869	1.0201
	M2R4	1.6026	0.9306	1.1290	1.1689
MD	M1D1	1.3613	0.7521	0.9211	1.0667
	M1D2	1.6540	0.9453	1.0328	0.8683
	M1D3	1.6029	1.0320	0.9612	1.0062
	M2D1	1.3561	0.7203	0.9973	1.1589
	M2D2	1.3060	0.9289	1.0956	0.9805
	M2D3	1.6159	0.9680	0.9992	0.9230

Source Table 10--(continued)

Variable	Variant	Level of practice (A)			
		A1	A2	A3	A4
MC	M1C1	1.5415	0.9190	0.9623	1.0341
	M1C2	1.5373	0.9006	0.9811	0.9267
	M2C1	1.5501	0.8600	1.0351	1.0495
	M2C2	1.4511	0.8848	1.0263	0.9921
RD	R1D1	1.3950	0.6968	0.7631	0.9246
	R1D2	1.5749	0.8853	1.0415	0.8384
	R1D3	1.5331	0.7891	0.9452	0.8008
	R2D1	1.3104	0.7465	0.9332	1.0693
	R2D2	1.4130	0.8541	0.9282	0.8022
	R2D3	1.4967	0.9575	0.9511	0.8567
	R3D1	1.3728	0.7263	0.8714	1.0468
	R3D2	1.6366	0.9531	1.0277	1.1017
	R3D3	1.5980	1.1121	0.9659	0.9649
	R4D1	1.3566	0.7752	1.2691	1.4105
	R4D2	1.6737	1.0659	1.2594	1.1575
	R4D3	1.8098	1.1413	1.0586	1.2360
RC	R1C1	1.5007	0.8163	0.9063	0.9063
	R1C2	1.5013	0.7645	0.9269	0.8029
	R2C1	1.3885	0.8308	0.8810	0.8721
	R2C2	1.4249	0.8746	0.9940	0.9467
	R3C1	1.5737	0.9104	0.9264	0.9601
	R3C2	1.4979	0.9506	0.9836	0.9807
	R4C1	1.7203	1.0005	1.2811	1.4287
	R4C2	1.5527	0.9811	1.1103	1.1073
DC	D1C1	1.3758	0.7273	0.9711	1.1570
	D1C2	1.3416	0.7451	1.0551	1.0686
	D2C1	1.6365	0.9373	1.0643	0.9628
	D2C2	1.3473	0.9369	1.0641	0.8860
	D3C1	1.6251	1.0039	0.9607	1.0056
	D3C2	1.5937	0.9961	0.9997	0.9236
S	S1	1.5822	0.9232	0.9927	1.0655
	S2	1.4578	0.8590	1.0097	0.9357

Source Table 11

Results of Analyses of Covariance Among Means: Comparisons Within the B2 Group

Source	df	Mean Square A1	Mean Square A2	Mean Square A3	Mean Square A4
Total	383	0.0910	0.1045	0.1261	0.2402
Regression	28	0.3286	0.3464	0.3928	0.8317
Error	355	0.0723	0.0854	0.1051	0.1935
M	1	0.0617	0.1345	0.3347	0.1569
R	3	0.5610***	0.7391***	1.6378***	3.2652***
D	2	1.5219***	2.4289***	0.3943*	1.2597**
C	1	0.1707	0.0010	0.0024	0.6529
MR	3	0.0128	0.0917	0.4436**	0.6604*
MD	2	0.0929	0.0189	0.0119	0.3693
MC	1	0.1170	0.0449	0.0183	0.0611
RD	6	0.0999	0.1943*	0.2992**	0.0718
RC	3	0.1314	0.0521	0.3629*	0.7405**
DC	2	0.0240	0.0055	0.0323	0.0011
S	1	0.2449	0.0824	0.0058	0.3370
MA	1	0.1672	0.0623	0.3706	1.1193*
CA	1	0.1385	0.0557	0.3404	0.8903*
IQ	1	0.0997	0.0301	0.3199	0.8629*

* P< .05
** P< .01
*** P< .001

Source Table 12

Results of Kramer's Multiple Range Test of Differences Between Pairs of Means: Comparisons Within the B2 Group

Variable	Level of Practice	Comparison	Weighted Difference	$z_{.05}$ S	$z_{.01}$ S	Results
R	A1	R2:R1	0.5736	0.7479	0.9828	R2=R1
		R2:R3	1.1030	0.7884	1.0260	R2<R3**
		R2:R4	1.7651	0.8154	1.0530	R2<R4**
		R1:R3	0.1969	0.7479	0.9828	R1=R3
		R1:R4	0.7297	0.7884	1.0260	R1=R4
		R3:R4	0.7121	0.7479	0.9828	R3=R4
R	A2	R1:R2	0.6104	0.8033	1.0556	R1=R2
		R1:R3	1.3727	0.8468	1.1020	R1<R3**
		R1:R4	1.9635	0.8758	1.1310	R1<R4**
		R2:R3	0.7623	0.8033	1.0556	R2=R3
		R2:R4	1.3531	0.8468	1.1020	R2<R4**
		R3:R4	0.5908	0.8033	1.0556	R3=R4
R	A3	R1:R2	0.2048	0.8864	1.1648	R1=R2
		R1:R3	0.3762	0.9344	1.2160	R1=R3
		R1:R4	2.7346	0.9664	1.2480	R1<R4**
		R2:R3	0.1715	0.8864	1.1648	R2=R3
		R2:R4	2.5298	0.9344	1.2160	R2<R4**
		R3:R4	2.3584	0.8864	1.1648	R3<R4**
R	A4	R1:R2	0.5369	1.2188	1.6016	R1=R2
		R1:R3	1.1346	1.2848	1.6720	R1=R3
		R1:R4	4.0505	1.3288	1.7160	R1<R4**
		R2:R3	0.5977	1.2188	1.6016	R2=R3
		R2:R4	3.5136	1.2848	1.6720	R2<R4**
		R3:R4	2.9159	1.2188	1.6016	R3<R4**
D	A1	D1:D2	2.1117	0.7479	0.9828	D1<D2**

Source Table 12—(continued)

Variable	Level of Practice	Comparison	Weighted Difference	$\bar{z}_{.05}^{S}$	$\bar{z}_{.01}^{S}$	Results
D (continued)	A1	D1:D3	2.2141	0.7884	1.0260	D1<D3**
		D2:D3	0.1623	0.7479	0.9828	D2=D3
D	A2	D1:D2	2.2729	0.8033	1.0556	D1<D2**
		D1:D3	2.9846	0.8468	1.1020	D1<D3**
		D2:D3	0.7116	0.8033	1.0556	D2=D3
D	A3	D1:D3	0.2376	0.8864	1.1648	D1=D3
		D1:D2	1.1879	0.9344	1.2160	D1<D2*
		D3:D2	0.9504	0.8864	1.1648	D3<D2*
D	A4	D2:D3	0.4548	1.2188	1.6016	D2=D3
		D2:D1	2.1315	1.2848	1.6720	D2<D1**
		D3:D1	1.6767	1.2188	1.6016	D3<D1**
MR	A1	F non-significant; all means equivalent.				
MR	A2	F non-significant; all means equivalent.				
MR	A3	M2R4:M1R2	0.5432	0.8864	1.1648	M2R4=M1R2
		M2R4:M1R1	0.8231	0.9344	1.2160	M2R4=M1R1
		M2R4:M1R3	1.2997	0.9664	1.2480	M2R4<M1R3**
		M2R4:M2R3	0.9661	0.9888	1.2736	M2R4=M2R3
		M2R4:M2R1	1.3031	1.0080	1.2928	M2R4<M2R1**
		M2R4:M2R2	1.5011	1.0208	1.3088	M2R4<M2R2**
		M2R4:M1R4	1.5392	1.0336	1.3248	M2R4<M1R4**
		M1R2:M1R1	0.1979	0.8864	1.1648	M1R2=M1R1
		M1R2:M1R3	0.5350	0.9344	1.2160	M1R2=M1R3
		M1R2:M2R3	0.8231	0.9664	1.2480	M1R2=M2R3
		M1R2:M2R1	1.2997	0.9888	1.2736	M1R2<M2R1**
		M1R2:M2R2	0.9120	1.0080	1.2928	M1R2=M2R2
		M1R2:M1R4	1.5011	1.0208	1.3088	M1R2<M1R4**
		M1R1:M1R3	0.3371	0.8864	1.1648	M1R1=M1R3
		M1R1:M2R3	0.5432	0.9344	1.2160	M1R1=M2R3
		M1R1:M2R1	0.5888	0.9664	1.2480	M1R1=M2R1
		M1R1:M2R2	1.2997	0.9888	1.2736	M1R1<M2R2**
		M1R1:M1R4	1.3031	1.0080	1.2928	M1R1<M1R4**
		M1R3:M2R3	0.0384	0.8864	1.1648	M1R3=M2R3
		M1R3:M2R1	0.5432	0.9344	1.2160	M1R3=M2R1
		M1R3:M2R2	0.8231	0.9664	1.2480	M1R3=M2R2
		M1R3:M1R4	0.9661	0.9888	1.2736	M1R3=M1R4
		M2R3:M2R1	0.3371	0.8864	1.1648	M2R3=M2R1
		M2R3:M2R2	0.5350	0.9344	1.2160	M2R3=M2R2

Source Table 12—(continued)

Variable	Level of Practice	Comparison	Weighted Difference	$\bar{a}_{.05}^{S}$	$\bar{a}_{.01}^{S}$	Results
MR	A3 (continued)	M2R3:M1R4	1.2997	0.9664	1.2480	M2R3<M1R4**
		M2R1:M2R2	0.1979	0.8864	1.1648	M2R1=M2R2
		M2R1:M1R4	0.8231	0.9344	1.2160	M2R1=M1R4
		M2R2:M1R4	0.5432	0.8864	1.1648	M2R2=M1R4
MR	A4	M2R4:M1R2	0.6513	1.2188	1.6016	M2R4=M1R2
		M2R4:M1R3	1.2443	1.2848	1.6720	M2R4=M1R3
		M2R4:M1R1	1.4106	1.3288	1.7160	M2R4<M1R1*
		M2R4:M2R1	1.3404	1.3596	1.7512	M2R4=M2R1
		M2R4:M2R3	1.4579	1.3860	1.7776	M2R4<M2R3*
		M2R4:M2R2	1.8773	1.4036	1.7996	M2R4<M2R2**
		M2R4:M1R4	1.9088	1.4212	1.8216	M2R4<M1R4**
		M1R2:M1R3	0.4194	1.2188	1.6016	M1R2=M1R3
		M1R2:M1R1	0.5369	1.2848	1.6720	M1R2=M1R1
		M1R2:M2R1	1.2443	1.3288	1.7160	M1R2=M2R1
		M1R2:M2R3	1.4106	1.3596	1.7512	M1R2<M2R3*
		M1R2:M2R2	1.1568	1.3860	1.7776	M1R2=M2R2
		M1R2:M1R4	1.8773	1.4036	1.7996	M1R2<M1R4**
		M1R3:M1R1	0.1176	1.2188	1.6016	M1R3=M1R1
		M1R3:M2R1	0.6513	1.2848	1.6720	M1R3=M2R1
		M1R3:M2R3	0.4720	1.3288	1.7160	M1R3=M2R3
		M1R3:M2R2	1.4106	1.3596	1.7512	M1R3<M2R3*
		M1R3:M1R4	1.4579	1.3860	1.7776	M1R3<M1R4*
		M1R1:M2R1	0.2800	1.2188	1.6016	M1R1=M2R1
		M1R1:M2R3	0.6513	1.2848	1.6720	M1R1=M2R3
		M1R1:M2R2	1.2443	1.3288	1.7160	M1R1=M2R2
		M1R1:M1R4	1.3404	1.3596	1.7512	M1R1=M1R4
		M2R1:M2R3	0.1176	1.2188	1.6016	M2R1=M2R3
		M2R1:M2R2	0.5369	1.2848	1.6720	M2R1=M2R2
		M2R1:M1R4	1.4106	1.3288	1.7160	M2R1<M1R4*
		M2R3:M2R2	0.4194	1.2188	1.6016	M2R3=M2R2
		M2R3:M1R4	1.2443	1.2848	1.6720	M2R3=M1R4
		M2R2:M1R4	0.6513	1.2188	1.6016	M2R2=M1R4
RD	A1	F non-significant; all means equivalent.				
RD	A2	R1D3:R4D1	0.4315	0.8033	1.0556	R1D3=R4D1
		R1D3:R3D1	0.5309	0.8468	1.1020	R1D3=R3D1
		R1D3:R2D2	0.5756	0.8758	1.1310	R1D3=R2D2
		R1D3:R3D2	0.7567	0.8961	1.1542	R1D3=R3D2
		R1D3:R2D3	0.7351	0.9135	1.1716	R1D3=R2D3
		R1D3:R4D2	1.2224	0.9251	1.1861	R1D3<R4D2**
		R1D3:R4D3	1.0407	0.9367	1.2006	R1D3<R4D3*
		R1D3:R2D1	1.3853	0.9454	1.2094	R1D3<R2D1**
		R1D3:R1D2	1.0311	0.9541	1.2180	R1D3<R1D2*

Source Table 12—(continued)

Vari-able	Level of Practice	Compari-son	Weighted Difference	$Z_{.05}^{S}$	$Z_{.01}^{S}$	Results
		R1D3:R1D1	1.1114	0.9599	1.2267	R1D3<R1D1*
		R1D3:R3D3	1.2672	0.9686	1.2354	R1D3<R3D3**
		R4D1:R3D1	0.0790	0.8033	1.0556	R4D1=R3D1
		R4D1:R2D2	0.1413	0.8468	1.1020	R4D1=R2D2
		R4D1:R3D2	0.3273	0.8758	1.1310	R4D1=R3D2
		R4D1:R2D3	0.4967	0.8961	1.1542	R4D1=R2D3
		R4D1:R4D2	0.5889	0.9135	1.1716	R4D1=R4D2
		R4D1:R4D3	0.6708	0.9251	1.1861	R4D1=R4D3
		R4D1:R2D1	0.7579	0.9367	1.2006	R4D1=R2D1
		R4D1:R1D2	0.9555	0.9454	1.2094	R4D1<R1D2*
		R4D1:R1D1	0.8452	0.9541	1.2180	R4D1=R1D1
		R4D1:R3D3	1.1706	0.9599	1.2267	R4D1<R3D3*
		R3D1:R2D2	0.0412	0.8033	1.0556	R3D1=R2D2
		R3D1:R3D2	0.1698	0.8468	1.1020	R3D1=R3D2
		R3D1:R2D3	0.3966	0.8758	1.1310	R3D1=R2D3
		R3D1:R4D2	0.6880	0.8961	1.1542	R3D1=R4D2
		R3D1:R4D3	0.7924	0.9135	1.1716	R3D1=R4D3
		R3D1:R2D1	0.6790	0.9251	1.1861	R3D1=R2D1
		R3D1:R1D2	0.8561	0.9367	1.2006	R3D1=R1D2
		R3D1:R1D1	0.7663	0.9454	1.2093	R3D1=R1D1
		R3D1:R3D3	0.7906	0.9541	1.2180	R3D1=R3D3
		R2D2:R3D2	0.1469	0.8033	1.0556	R2D2=R3D2
RD	A2 (continued)	R2D2:R2D3	0.2656	0.8468	1.1020	R2D2=R2D3
		R2D2:R4D2	0.5106	0.8758	1.1310	R2D2=R4D2
		R2D2:R4D3	0.7515	0.8961	1.1542	R2D2=R4D3
		R2D2:R2D1	0.6118	0.9135	1.1716	R2D2=R2D1
		R2D2:R1D2	0.6478	0.9251	1.1861	R2D2=R1D2
		R2D2:R1D1	0.9293	0.9367	1.2006	R2D2=R1D1
		R2D2:R3D3	1.0293	0.9454	1.2093	R2D2=R3D3*
		R3D2:R2D3	0.1694	0.8033	1.0556	R3D2=R2D3
		R3D2:R4D2	0.3637	0.8468	1.1020	R3D2=R4D2
		R3D2:R4D3	0.5704	0.8758	1.1310	R3D2=R4D3
		R3D2:R2D1	0.6327	0.8961	1.1542	R3D2=R2D1
		R3D2:R1D2	0.5009	0.9135	1.1716	R3D2=R1D2
		R3D2:R1D1	0.7432	0.9251	1.1861	R3D2=R1D1
		R3D2:R3D3	0.6302	0.9367	1.2006	R3D2=R3D3
		R2D3:R4D2	0.2894	0.8033	1.0556	R2D3=R4D2
		R2D3:R4D3	0.3166	0.8468	1.1020	R2D3=R4D3
		R2D3:R2D1	0.3462	0.8758	1.1310	R2D3=R2D1
		R2D3:R1D2	0.4651	0.8961	1.1542	R2D3=R1D2
		R2D3:R1D1	0.5739	0.9135	1.1716	R2D3=R1D1
		R2D3:R3D3	0.5321	0.9251	1.1861	R2D3=R3D3
		R4D2:R4D3	0.0810	0.8033	1.0556	R4D2=R4D3
		R4D2:R2D1	0.1709	0.8468	1.1020	R4D2=R2D1
		R4D2:R1D2	0.1372	0.8758	1.1310	R4D2=R1D2

Source Table 12—(continued)

Variable	Level of Practice	Comparison	Weighted Difference	$Z_{.05}^{5}$	$Z_{.01}^{5}$	Results
RD	A2 (continued)	R4D2:R1D1	0.2807	0.8961	1.1542	R4D2=R1D1
		R4D2:R3D3	0.3801	0.9135	1.1716	R4D2=R3D3
		R4D3:R2D1	0.0623	0.8033	1.0556	R4D3=R2D1
		R4D3:R1D2	0.0641	0.8468	1.1020	R4D3=R1D2
		R4D3:R1D1	0.1729	0.8750	1.1310	R4D3=R1D1
		R4D3:R3D3	0.2155	0.8961	1.1542	R4D3=R3D3
		R2D1:R1D2	0.0018	0.8033	1.0556	R2D1=R1D2
		R2D1:R1D1	0.0873	0.8468	1.1020	R2D1=R1D1
		R2D1:R3D3	0.2106	0.8750	1.1310	R2D1=R3D3
		R1D2:R1D1	0.0813	0.8033	1.0556	R1D2=R1D1
		R1D2:R3D3	0.2075	0.8468	1.1020	R1D2=R3D3
		R1D1:R3D3	0.1000	0.8033	1.0556	R1D1=R3D3
RD	A3	R4D3:R1D1	0.0404	0.8864	1.1648	R4D3=R1D1
		R4D3:R2D2	0.3818	0.9344	1.2160	R4D3=R2D2
		R4D3:R3D1	0.6495	0.9664	1.2480	R4D3=R3D1
		R4D3:R4D2	0.7569	0.9888	1.2736	R4D3=R4D2
		R4D3:R3D2	1.1039	1.0080	1.2928	R4D3<R3D2*
		R4D3:R3D3	1.0254	1.0208	1.3088	R4D3<R3D3*
		R4D3:R2D3	1.0441	1.0336	1.3248	R4D3<R2D3*
		R4D3:R2D1	1.3496	1.0432	1.3344	R4D3<R2D1**
		R4D3:R1D3	1.1360	1.0528	1.3440	R4D3<R1D3*
		R4D3:R1D2	1.5619	1.0592	1.3536	R4D3<R1D2**
		R4D3:R4D1	1.5180	1.0688	1.3632	R4D3<R4D1**
		R1D1:R2D2	0.3440	0.8864	1.1648	R1D1=R2D2
		R1D1:R3D1	0.4843	0.9344	1.2160	R1D1=R3D1
		R1D1:R4D2	0.9781	0.9664	1.2480	R1D1<R4D2*
		R1D1:R3D2	1.0635	0.9888	1.2736	R1D1<R3D2*
		R1D1:R3D3	1.2583	1.0080	1.2928	R1D1<R3D3*
		R1D1:R2D3	1.2820	1.0208	1.3088	R1D1<R2D3*
		R1D1:R2D1	1.0337	1.0336	1.3248	R1D1<R2D1*
		R1D1:R1D3	1.0440	1.0432	1.3344	R1D1<R1D3*
		R1D1:R1D2	1.1371	1.0528	1.3440	R1D1<R1D2*
		R1D1:R4D1	1.5720	1.0592	1.3536	R1D1<R4D1**
		R2D2:R3D1	0.2694	0.8864	1.1648	R2D2=R3D1
		R2D2:R4D2	0.5058	0.9344	1.2160	R2D2=R4D2
		R2D2:R3D2	0.5681	0.9664	1.2480	R2D2=R3D2
		R2D2:R3D3	0.9144	0.9888	1.2736	R2D2=R3D3
		R2D2:R2D3	0.7010	1.0080	1.2928	R2D2=R2D3
		R2D2:R2D1	0.7213	1.0208	1.3088	R2D2=R2D1
		R2D2:R1D3	1.0697	1.0336	1.3248	R2D2<R1D3*
		R2D2:R1D2	0.9298	1.0432	1.3344	R2D2=R1D2
		R2D2:R4D1	1.6471	1.0528	1.3440	R2D2<R4D1**
		R3D1:R4D2	0.3712	0.8864	1.1648	R3D1=R4D2
		R3D1:R3D2	0.3364	0.9344	1.2160	R3D1=R3D2
		R3D1:R3D3	0.4763	0.9664	1.2480	R3D1=R3D3
		R3D1:R2D3	0.6687	0.9888	1.2736	R3D1=R2D3

Source Table 12—(continued)

Variable	Level of Practice	Comparison	Weighted Difference	$R_{.05}^{3}$	$R_{.01}^{3}$	Results
RD (continued)	A3	R3D1:R2D1	0.5494	1.0080	1.2928	R3D1=R2D1
		R3D1:R1D3	0.7951	1.0208	1.3088	R3D1=R1D3
		R3D1:R1D2	0.9023	1.0336	1.3248	R3D1=R1D2
		R3D1:R4D1	1.0877	1.0432	1.3344	R3D1<R4D1*
		R4D2:R3D2	0.0624	0.8864	1.1648	R4D2=R3D2
		R4D2:R3D3	0.2720	0.9344	1.2160	R4D2=R3D3
		R4D2:R2D3	0.2955	0.9664	1.2480	R4D2=R2D3
		R4D2:R2D1	0.3226	0.9888	1.2736	R4D2=R2D1
		R4D2:R1D3	0.4291	1.0080	1.2928	R4D2=R1D3
		R4D2:R1D2	0.4240	1.0208	1.3088	R4D2=R1D2
		R4D2:R4D1	0.7521	1.0336	1.3248	R4D2=R4D1
		R3D2:R3D3	0.1456	0.8864	1.1648	R3D2=R3D3
		R3D2:R2D3	0.2185	0.9344	1.2160	R3D2=R2D3
		R3D2:R2D1	0.2457	0.9664	1.2480	R3D2=R2D1
		R3D2:R1D3	0.3478	0.9888	1.2736	R3D2=R1D3
		R3D2:R1D2	0.3617	1.0080	1.2928	R3D2=R1D2
		R3D2:R4D1	0.9275	1.0208	1.3088	R3D2=R4D1
		R3D3:R2D3	0.0187	0.8864	1.1648	R3D3=R2D3
		R3D3:R2D1	0.0509	0.9344	1.2160	R3D3=R2D1
		R3D3:R1D3	0.1226	0.9664	1.2480	R3D3=R1D3
		R3D3:R1D2	0.2615	0.9888	1.2736	R3D3=R1D2
		R3D3:R4D1	0.7327	1.0080	1.2928	R3D3=R4D1
		R2D3:R2D1	0.0203	0.8864	1.1648	R2D3=R2D1
		R2D3:R1D3	0.1039	0.9344	1.2160	R2D3=R1D3
		R2D3:R1D2	0.2396	0.9664	1.2480	R2D3=R1D2
		R2D3:R4D1	0.7090	0.9888	1.2736	R2D3=R4D1
		R2D1:R1D3	0.1037	0.8864	1.1648	R2D1=R1D3
		R2D1:R1D2	0.2124	0.9344	1.2160	R2D1=R1D2
		R2D1:R4D1	0.5383	0.9664	1.2480	R2D1=R4D1
		R1D3:R1D2	0.0797	0.8864	1.1648	R1D3=R1D2
		R1D3:R4D1	0.5736	0.9344	1.2160	R1D3=R4D1
		R1D2:R4D1	0.4664	0.8864	1.1648	R1D2=R4D1
RD	A4	F non-significant; all means equivalent.				
RC	A1	F non-significant; all means equivalent.				
RC	A2	F non-significant; all means equivalent.				
RC	A3	F non-significant; all means equivalent.				

Source Table 12—(continued)

Variable	Level of Practice	Comparison	Weighted Difference	$Z_{.05}^{S}$	$Z_{.01}^{S}$	Results
RC	A4	R4C2:R2C1	0.5637	1.2188	1.6016	R4C2=R2C1
		R4C2:R3C1	0.9398	1.2848	1.6720	R4C2=R3C1
		R4C2:R1C2	1.0680	1.3288	1.7160	R4C2=R1C2
		R4C2:R1C1	1.7966	1.3596	1.7512	R4C2<R1C1**
		R4C2:R3C2	1.6755	1.3860	1.7776	R4C2<R3C2*
		R4C2:R2C2	1.9299	1.4036	1.7996	R4C2<R2C2**
		R4C2:R4C1	1.9120	1.4212	1.8216	R4C2<R4C1**
		R2C1:R3C1	0.2632	1.2188	1.6016	R2C1=R3C1
		R2C1:R1C2	0.9398	1.2848	1.6720	R2C1=R1C2
		R2C1:R1C1	0.8675	1.3288	1.7160	R2C1=R1C1
		R2C1:R3C2	1.7966	1.3596	1.7512	R2C1<R3C2**
		R2C1:R2C2	1.2462	1.3860	1.7776	R2C1=R2C2
		R2C1:R4C1	1.9299	1.4036	1.7996	R2C1<R4C1**
		R3C1:R1C2	0.5637	1.2188	1.6016	R3C1=R1C2
		R3C1:R1C1	0.6075	1.2848	1.6720	R3C1=R1C1
		R3C1:R3C2	0.8240	1.3288	1.7160	R3C1=R3C2
		R3C1:R2C2	1.7966	1.3596	1.7512	R3C1<R2C2**
		R3C1:R4C1	1.6755	1.3860	1.7776	R3C1<R4C1*
		R1C2:R1C1	0.1680	1.2188	1.6016	R1C2=R1C1
		R1C2:R3C2	0.6075	1.2848	1.6720	R1C2=R3C2
		R1C2:R2C2	0.8675	1.3288	1.7160	R1C2=R2C2
		R1C2:R4C1	1.7966	1.3596	1.7512	R1C2<R4C1**
		R1C1:R3C2	0.5637	1.2188	1.6016	R1C1=R3C2
		R1C1:R2C2	0.9398	1.2848	1.6720	R1C1=R1C2
		R1C1:R4C1	1.0680	1.3288	1.7160	R1C1=R4C1
		R3C2:R2C2	0.2632	1.2188	1.6016	R3C2=R2C2
		R3C2:R4C1	0.9398	1.2848	1.6720	R3C2=R4C1
		R2C2:R4C1	0.5637	1.2188	1.6016	R2C2=R4C1

* $P < .05$
** $P < .01$

Source Table 13

Means (Rounded): Comparisons Within the B3 Group

Variable	Variant	Level of practice (A)			
		A1	A2	A3	A4
M	M1	1.5396	1.0081	0.9795	1.0627
	M2	1.4678	1.0045	1.0793	1.0733
R	R1	1.4561	0.9594	0.8845	0.9032
	R2	1.5116	1.0024	1.0459	1.0459
	R3	1.5066	1.0054	0.9748	1.0603
	R4	1.5405	1.0580	1.2124	1.2626
D	D1	1.3285	0.8586	1.0192	1.2596
	D2	1.5749	1.0738	1.0787	0.9865
	D3	1.6077	1.0865	0.9903	0.9579
C	C1	1.5079	0.9821	1.0242	1.0809
	C2	1.4995	1.0305	1.0346	1.0551
MR	M1R1	1.4305	0.9304	0.7852	0.8552
	M1R2	1.5483	1.0360	0.9980	1.0352
	M1R3	1.5558	1.0252	0.9030	1.0011
	M1R4	1.6238	1.0408	1.2318	1.3593
	M2R1	1.4817	0.9884	0.9838	0.9512
	M2R2	1.4749	0.9688	1.0938	1.0566
	M2R3	1.4574	0.9856	1.0466	1.1195
	M2R4	1.4572	1.0752	1.1930	1.1659
MD	M1D1	1.4001	0.8314	0.9418	1.1933
	M1D2	1.5937	1.1089	1.0474	1.0148
	M1D3	1.6250	1.0840	0.9493	0.9800
	M2D1	1.2569	0.8858	1.0966	1.3259
	M2D2	1.5561	1.0387	1.1100	0.9582
	M2D3	1.5904	1.0890	1.0313	0.9358

Source Table 13--(continued)

Variable	Variant	Level of practice (A)			
		A1	A2	A3	A4
MC	M1C1	1.3301	0.9644	1.0035	1.1111
	M1C2	1.5491	1.0518	0.9553	1.0143
	M2C1	1.4857	0.9998	1.0449	1.0507
	M2C2	1.4499	1.0092	1.1137	1.0939
RD	R1D1	1.3440	0.8536	0.7979	1.0816
	R1D2	1.5800	0.9980	0.9524	0.8152
	R1D3	1.4363	1.0286	0.9032	0.8128
	R2D1	1.3367	0.9184	1.1116	1.2403
	R2D2	1.6144	1.0643	1.0396	0.9715
	R2D3	1.6475	1.0245	0.9865	0.9259
	R3D1	1.3562	0.8481	0.9680	1.3233
	R3D2	1.5513	1.0923	1.0507	0.9514
	R3D3	1.6123	1.0758	0.9057	0.9062
	R4D1	1.2771	0.8143	1.1993	1.3932
	R4D2	1.5459	1.1426	1.2721	1.2079
	R4D3	1.7347	1.2171	1.1658	1.1867
RC	R1C1	1.5188	0.9675	0.9139	0.9373
	R1C2	1.3934	0.9513	0.8551	0.8691
	R2C1	1.4739	0.9129	1.0224	0.9876
	R2C2	1.5493	1.0919	1.0694	1.1042
	R3C1	1.5377	0.9784	0.9628	1.0281
	R3C2	1.4755	1.0324	0.9868	1.0925
	R4C1	1.4712	1.0696	1.1977	1.3706
	R4C2	1.5798	1.0464	1.2271	1.1546
DC	D1C1	1.3172	0.8525	1.0348	1.2808
	D1C2	1.3398	0.8647	1.0036	1.2384
	D2C1	1.6390	1.0320	1.0517	0.9878
	D2C2	1.5108	1.1156	1.1057	0.9852
	D3C1	1.5675	1.0618	0.9861	0.9741
	D3C2	1.6479	1.1112	0.9945	0.9417

Source Table 14

Results of Analyses of Covariance Among Means: Comparisons Within the B3 Group

Source	df	Mean Square A1	Mean Square A2	Mean Square A3	Mean Square A4
Total	383	0.0836	0.1143	0.1253	0.2579
Regression	28	0.2593	0.3513	0.3935	0.8535
Error	355	0.0697	0.0957	0.1041	0.2109
M	1	0.1742	0.0012	0.9577**	0.0108
R	3	0.0333	0.1564	1.8473**	2.0983***
D	2	1.6579***	2.0958***	0.2599	3.5462***
C	1	0.0044	0.2252	0.0104	0.0640
MR	3	0.0596	0.0848	0.2473	0.4853
MD	2	0.0383	0.1253	0.0753	0.3571
MC	1	0.0375	0.1463	0.3279	0.4847
RD	6	0.0523	0.1326	0.1055	0.0748
RC	3	0.1304	0.2108	0.0533	0.5293
DC	2	0.4758**	0.0409	0.0580	0.0138
S	1	0.0052	0.0583	0.0004	0.5867
MA	1	0.1112	0.2198	0.0206	0.0140
CA	1	0.0678	0.1430	0.0052	0.0622
IQ	1	0.0930	0.2216	0.0035	0.0384

** P< .01
*** P< .001

Source Table 15

Results of Kramer's Multiple Range Test of Differences Between Pairs of Means: Comparisons Within the B3 Group

Variable	Level of Practice	Comparison	Weighted Difference	$s_{.05}S$	$s_{.01}S$	Results
M	A1	F non-significant; all means equivalent.				
M	A2	F non-significant; all means equivalent.				
M	A3	M1:M2	1.3829	0.8864	1.1648	M1<M2**
M	A4	F non-significant; all means equivalent.				
R	A1	F non-significant; all means equivalent.				
R	A2	F non-significant; all means equivalent.				
R	A3	R1:R3	0.8848	0.8864	1.1648	R1=R3
		R1:R2	1.5814	0.9344	1.2160	R1<R2**
		R1:R4	3.2128	0.9664	1.2480	R1<R4**
		R3:R2	0.6966	0.8864	1.1648	R3=R2
		R3:R4	2.3280	0.9344	1.2160	R3<R4**
		R2:R4	1.6314	0.8864	1.1648	R2<R4**
R	A4	R1:R2	1.3982	1.2742	1.6744	R1<R2*
		R1:R3	1.5393	1.3432	1.7480	R1<R3*
		R1:R4	3.5214	1.3892	1.7940	R1<R4**
		R2:R3	0.1411	1.2742	1.6744	R2=R3
		R2:R4	2.1232	1.3432	1.7480	R2<R4**
		R3:R4	1.9821	1.2742	1.6744	R3<R4**
D	A1	D1:D2	2.1339	0.7202	0.9464	D1<D2**
		D1:D3	2.4018	0.7592	0.9880	D1<D3**
		D2:D3	0.3042	0.7202	0.9464	D2=D3
D	A2	D1:D2	2.4347	0.8587	1.1284	D1<D2**
		D1:D3	2.5784	0.9052	1.1780	D1<D3**
		D2:D3	0.1437	0.8587	1.1284	D2=D3

Source Table 15--(continued)

Variable	Level of Practice	Comparison	Weighted Difference	$\bar{x}_{.05}^{S}$	$\bar{x}_{.01}^{S}$	Results
D	A3	F non-significant; all means equivalent.				
D	A4	D3:D2	0.3236	1.2742	1.6744	D3=D2
		D3:D1	3.4133	1.3432	1.7480	D3<D1**
		D2:D1	3.0898	1.2742	1.6744	D2<D1**
DC	A1	D2C2:D3C1	0.2470	0.7202	0.9464	D2C2=D3C1
		D2C2:D1C1	0.7200	0.7592	0.9880	D2C2=D1C1
		D2C2:D1C2	0.6992	0.7852	1.0140	D2C2=D1C2
		D2C2:D3C2	0.9340	0.8034	1.0348	D2C2<D3C2*
		D2C2:D2C1	0.9733	0.8190	1.0504	D2C2<D2C1*
		D3C1:D1C1	0.2664	0.7202	0.9464	D3C1=D1C1
		D3C1:D1C2	0.9751	0.7592	0.9880	D3C1<D1C2*
		D3C1:D3C2	0.7214	0.7852	1.0140	D3C1=D3C2
		D3C1:D2C1	0.9340	0.8034	1.0348	D3C1<D2C1*
		D1C1:D1C2	0.2461	0.7202	0.9464	D1C1=D1C2
		D1C1:D3C2	0.9751	0.7592	0.9880	D1C1<D3C2*
		D1C1:D2C1	0.6992	0.7852	1.0140	D1C1=D2C1
		D1C2:D3C2	0.2664	0.7202	0.9464	D1C2=D3C2
		D1C2:D2C1	0.7200	0.7592	0.9880	D1C2=D2C1
		D3C2:D2C1	0.2470	0.7202	0.9464	D3C2=D2C1
DC	A2	F non-significant; all means equivalent.				
DC	A3	F non-significant; all means equivalent.				
DC	A4	F non-significant; all means equivalent.				

* P < .05

** P < .01

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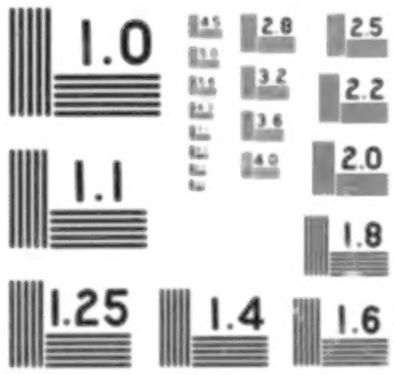
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MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS - 1963

Source Table 16

Means (Rounded): Comparisons Within the B4 Group

Variable	Variant	Level of practice (A)			
		A1	A2	A3	A4
M	M1	0.9035	1.0905	1.1081	1.3144
	M2	0.9079	1.0583	1.1349	1.2282
R	R1	0.8230	0.9635	0.9218	0.9562
	R2	0.7460	1.0079	1.0821	1.0792
	R3	0.9905	1.1565	1.1444	1.4112
	R4	1.0633	1.1697	1.3377	1.6386
D	D1	0.6245	0.8904	1.1588	1.4911
	D2	1.1019	1.1392	1.1760	1.2011
	D3	0.9907	1.1936	1.0297	1.1217
C	C1	0.9016	1.0541	1.1403	1.2890
	C2	0.9098	1.0947	1.1027	1.2536
MR	M1R1	0.7553	0.9797	0.8733	1.0148
	M1R2	0.7746	0.9965	0.9553	1.0581
	M1R3	0.9129	1.1330	1.1639	1.3801
	M1R4	1.1712	1.2528	1.4399	1.8046
	M2R1	0.8907	0.9473	0.9703	0.8976
	M2R2	0.7174	1.0193	1.2089	1.1003
	M2R3	1.0681	1.1800	1.1249	1.4423
	M2R4	0.9554	1.0866	1.2355	1.4726
MD	M1D1	0.6504	0.9148	1.1023	1.4760
	M1D2	1.1059	1.1744	1.2115	1.3328
	M1D3	0.9542	1.1823	1.0105	1.1344
	M2D1	0.5986	0.8660	1.2153	1.5062
	M2D2	1.0979	1.1040	1.1405	1.0694
	M2D3	1.0272	1.2049	1.1941	1.1090

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Source Table -- (continued)

Variable	Variant	Level of practice (A)			
		A1	A2	A3	A4
MC	M1C1	0.9353	1.0761	1.1250	1.2220
	M1C2	0.8717	1.1049	1.0912	1.3206
	M2C1	0.9679	1.0321	1.1556	1.2698
	M2C2	0.9479	1.0845	1.1142	1.1866
RD	R1D1	0.5845	0.7500	0.9232	1.1348
	R1D2	1.0526	0.9923	0.9322	0.8601
	R1D3	0.8319	1.1482	0.9100	0.8737
	R2D1	0.5301	0.7601	1.1081	1.2799
	R2D2	0.8021	1.0792	1.1946	1.5209
	R2D3	0.9058	1.1844	0.9436	0.9360
	R3D1	0.8037	1.0988	1.2374	1.8636
	R3D2	1.1959	1.2397	1.2098	1.2937
	R3D3	0.9719	1.1310	0.9860	1.0763
	R4D1	0.5797	0.9527	1.3665	1.6861
	R4D2	1.3570	1.2456	1.3674	1.6289
	R4D3	1.2532	1.3108	1.2792	1.6008
RC	R1C1	0.8420	0.9123	0.9853	0.9720
	R1C2	0.8040	1.0147	0.8583	0.9404
	R2C1	0.9890	0.9993	1.1226	1.0504
	R2C2	1.1418	1.0165	1.0416	1.1080
	R3C1	0.9259	1.1575	1.1514	1.5011
	R3C2	1.0551	1.1555	1.1374	1.3213
	R4C1	1.0161	1.1473	1.3019	1.6325
	R4C2	1.1105	1.1921	1.3735	1.6447
DC	D1C1	0.5599	0.8693	1.1421	1.4683
	D1C2	0.6891	0.9115	1.1755	1.5139
	D2C1	1.1758	1.0810	1.2323	1.2516
	D2C2	1.0280	1.1974	1.1197	1.1506
	D3C1	0.9691	1.2120	1.0465	1.1471
	D3C2	1.0123	1.1752	1.0129	1.0963
S	S1	0.9642	1.1753	1.2242	1.5470
	S2	0.8472	0.9735	1.0188	0.9956

Source Table 17

Results oi Analyses of Covariance Among Means: Comparisons Within the B4 Group

Source	df	Mean Square A1	Mean Square A2	Mean Square A3	Mean Square A4
Total	383	0.1597	0.1995	0.1802	0.6137
Regression	27	1.0102	0.8226	0.8501	3.7180
Error	356	0.0952	0.1522	0.1294	0.3783
M	1	0.0006	0.0997	0.0691	0.7145
R	3	1.0021***	1.0409***	2.8397***	9.3009***
D	2	4.0089***	3.3330***	0.8169**	4.8263***
C	1	0.0042	0.1585	0.1359	0.1205
MR	3	0.3005*	0.2186	0.9137***	0.7982
MD	2	0.0441	0.0751	0.2728	0.7751
MC	1	0.2578	0.0134	0.0014	0.2197
RD	6	0.3533**	0.2756	0.1314	0.7574
RC	3	0.2638*	0.0495	0.1779	0.2523
DC	2	0.4434**	0.1875	0.1692	0.1761
S	1	0.2025	0.8702*	0.9015**	6.4966***
MA	-	--	--	--	--
CA	1	2.3443***	5.9096***	5.2730***	35.2730***
IQ	1	0.0129	0.0357	0.0198	0.4008

$*$ P< .05
$**$ P< .01
$***$ P< .001

Source Table 18

Results of Kramer's Multiple Range Test of Differences Between Pairs of Means: Comparisons Within the B4 Group

Variable	Level of Practice	Comparison	Weighted Difference	$z_{.05}\ S$	$z_{.01}\ S$	Results
R	A1	R2:R1	0.4555	0.8587	1.1284	R2=R1
		R2:R3	1.7115	0.9052	1.1780	R2<R3**
		R2:R4	2.3100	0.9362	1.2090	R2<R4**
		R1:R3	0.8033	0.8587	1.1284	R1=R3
		R1:R4	1.2253	0.9052	1.1780	R1<R4**
		R3:R4	0.4829	0.8587	1.1284	R3=R4
R	A2	R1:R2	0.4350	1.0803	1.4196	R1=R2
		R1:R3	1.8910	1.1388	1.4820	R1<R3**
		R1:R4	2.0203	1.1778	1.5210	R1<R4**
		R2:R3	1.4560	1.0803	1.4196	R2<R3**
		R2:R4	1.5853	1.1388	1.4820	R2<R4**
		R3:R4	0.1293	1.0803	1.4196	R3=R4
R	A3	R1:R2	1.5706	0.9972	1.3104	R1<R2**
		R1:R3	2.1810	1.0512	1.3680	R1<R3**
		R1:R4	4.0750	1.0872	1.4040	R1<R4**
		R2:R3	0.6104	0.9972	1.3104	R2=R3
		R2:R4	2.5044	1.0512	1.3680	R2<R4**
		R3:R4	1.8940	0.9972	1.3104	R3<R4**
R	A4	R1:R2	1.2052	1.7174	2.2568	R1=R2
		R1:R3	4.4581	1.8104	2.3560	R1<R3**
		R1:R4	6.6862	1.8724	2.4180	R1<R4**
		R2:R3	3.2529	1.7174	2.2568	R2<R3**
		R2:R4	5.4810	1.8104	2.3560	R2<R4**
		R3:R4	2.2281	1.7174	2.2568	R3<R4*
D	A1	D1:D3	3.0198	0.8587	1.1284	D1<D3**

* $P < .05$
** $P < .01$

Source Table 18--(continued)

Variable	Level of Practice	Comparison	Weighted Difference	$Z_{.05}S$	$Z_{.01}S$	Results
D	A1	D1:D2	3.9077	0.9052	1.1780	D1<D2**
(continued)		D3:D2	1.0252	0.8587	1.1284	D3<D2*
D	A2	D1:D2	2.8148	1.0803	1.4196	D1<D2**
		D1:D3	3.4303	1.1388	1.4820	D1<D3**
		D2:D3	0.6155	1.0803	1.4196	D2=D3
D	A3	D3:D1	1.4606	0.9972	1.3104	D3<D1**
		D3:D2	1.6552	1.0512	1.3680	D3<D2**
		D1:D2	1.9460	0.9972	1.3104	D1<D2**
D	A4	D3:D2	0.8983	1.7174	2.2568	D3=D2
		D3:D1	4.1793	1.8104	2.3560	D3<D1**
		D2:D1	3.2810	1.7174	2.2568	D2<D1**
MR	A1	M2R4:M1R3	0.2965	0.8587	1.1284	M2R4=M1R3
		M2R4:M1R1	0.4063	0.9052	1.1780	M2R4=M1R1
		M2R4:M2R2	0.5773	0.9362	1.2090	M2R4=M2R2
		M2R4:M1R2	1.2202	0.9579	1.2338	M2R4<M1R2*
		M2R4:M2R1	0.9618	0.9765	1.2524	M2R4=M2R1
		M2R4:M2R3	1.2305	0.9889	1.2679	M2R4<M2R3*
		M2R4:M1R4	1.1652	1.0013	1.2834	M2R4<M1R4*
		M1R3:M1R1	0.0551	0.8587	1.1284	M1R3=M1R1
		M1R3:M2R2	0.4063	0.9052	1.1780	M1R3=M2R2
		M1R3:M1R2	0.7358	0.9362	1.2090	M1R3=M1R2
		M1R3:M2R1	1.2202	0.9579	1.2338	M1R3<M2R1*
		M1R3:M2R3	0.7836	0.9765	1.2524	M1R3=M2R3
		M1R3:M1R4	1.2305	0.9889	1.2679	M1R3<M1R4*
		M1R1:M2R2	0.2965	0.8587	1.1284	M1R1=M2R2
		M1R1:M1R2	0.5697	0.9052	1.1780	M1R1=M1R2
		M1R1:M2R1	0.5558	0.9362	1.2090	M1R1=M2R1
		M1R1:M2R3	1.2202	0.9579	1.2338	M1R1<M2R3*
		M1R1:M1R4	0.9618	0.9765	1.2524	M1R1=M1R4
		M2R2:M1R2	0.3644	0.8587	1.1284	M2R2=M1R2
		M2R2:M2R1	0.5697	0.9052	1.1780	M2R2=M2R1
		M2R2:M2R3	0.7358	0.9362	1.2090	M2R2=M2R3
		M2R2:M1R4	1.2202	0.9579	1.2338	M2R2<M1R4*
		M1R2:M2R1	0.2965	0.8587	1.1284	M1R2=M2R1
		M1R2:M2R3	0.4063	0.9052	1.1780	M1R2=M2R3
		M1R2:M1R4	0.5773	0.9362	1.2090	M1R2=M1R4
		M2R1:M2R3	0.0551	0.8587	1.1284	M2R1=M2R3
		M2R1:M1R4	0.4063	0.9052	1.1780	M2R1=M1R4
		M2R3:M1R4	0.2965	0.8587	1.1284	M2R3=M1R4

Source Table 18--(continued)

Variable	Level of Practice	Comparison	Weighted Difference	$z_{.05}S$	$z_{.01}S$	Results
MR	A2	F non-significant; all means equivalent .				
MR	A3	M2R4:M1R2	0.0305	0.9972	1.3104	M2R4=M1R2
		M2R4:M1R1	1.1154	1.0512	1.3680	M2R4<M1R1*
		M2R4:M2R3	0.8103	1.0872	1.4040	M2R4=M2R3
		M2R4:M1R3	2.0577	1.1124	1.4328	M2R4<M1R3**
		M2R4:M2R1	1.4766	1.1340	1.4544	M2R4<M2R1**
		M2R4:M2R2	2.2437	1.1484	1.4724	M2R4<M2R2**
		M2R4:M1R4	1.8496	1.1628	1.4904	M2R4<M1R4**
		M1R2:M1R1	0.7672	0.9972	1.3104	M1R2=M1R1
		M1R2:M2R3	1.1154	1.0512	1.3680	M1R2<M2R3*
		M1R2:M1R3	1.4334	1.0872	1.4040	M1R2<M1R3**
		M1R2:M2R1	2.0577	1.1124	1.4328	M1R2<M2R1**
		M1R2:M2R2	1.8144	1.1340	1.4544	M1R2<M2R2**
		M1R2:M1R4	2.2437	1.1484	1.4724	M1R2<M1R4**
		M1R1:M2R3	0.0305	0.9972	1.3104	M1R1=M2R3
		M1R1:M1R3	0.6663	1.0512	1.3680	M1R1=M1R3
		M1R1:M2R1	0.5616	1.0872	1.4040	M1R1=M2R1
		M1R1:M2R2	2.0577	1.1124	1.4328	M1R1<M2R2**
		M1R1:M1R4	1.4766	1.1340	1.4544	M1R1<M1R4**
		M2R3:M1R3	0.5264	0.9972	1.3104	M2R3=M1R3
		M2R3:M2R1	0.6663	1.0512	1.3680	M2R3=M2R1
		M2R3:M2R2	1.4334	1.0872	1.4040	M2R3<M2R2**
		M2R3:M1R4	2.0577	1.1124	1.4328	M2R3<M1R4**
		M1R3:M2R1	0.0305	0.9972	1.3104	M1R3=M2R1
		M1R3:M2R2	1.1154	1.0512	1.3680	M1R3<M2R2*
		M1R3:M1R4	0.8103	1.0872	1.4040	M1R3=M1R4
		M2R1:M2R2	0.7672	0.9972	1.3104	M2R1=M2R2
		M2R1:M1R4	1.1154	1.0512	1.3680	M2R1<M1R4*
		M2R2:M1R4	0.0305	0.9972	1.3104	M2R2=M1R4
MR	A4	F non-significant; all means equivalent .				
RD	A1	R4D1:R2D2	0.3891	0.8587	1.1284	R4D1=R2D2
		R4D1:R3D3	0.5134	0.9052	1.1780	R4D1=R3D3
		R4D1:R1D3	0.7578	0.9362	1.2090	R4D1=R1D3
		R4D1:R3D2	1.0789	0.9579	1.2338	R4D1<R3D2*
		R4D1:R1D2	1.3950	0.9765	1.2524	R4D1<R1D2**
		R4D1:R1D1	0.8491	0.9889	1.2679	R4D1=R1D1
		R4D1:R2D1	1.2838	1.0013	1.2834	R4D1<R2D1**
		R4D1:R2D3	1.7311	1.0106	1.2927	R4D1<R2D3**
		R4D1:R3D1	1.4540	1.0199	1.3020	R4D1<R3D1**
		R4D1:R4D2	1.2724	1.0261	1.3113	R4D1<R4D2*
		R4D1:R4D3	1.2670	1.0354	1.3206	R4D1<R4D3*
		R2D2:R3D3	0.2365	0.8587	1.1284	R2D2=R3D3
		R2D2:R1D3	0.3945	0.9052	1.1780	R2D2=R1D3

Source Table 18--(continued)

Variable	Level of Practice	Comparison	Weighted Difference	$Z_{.05}S$	$Z_{.01}S$	Results
		R2D2:R3D2	0.8040	0.9362	1.2090	R2D2=R3D2
		R2D2:R1D2	0.8847	0.9579	1.2338	R2D2=R1D2
		R2D2:R1D1	0.8955	0.9765	1.2524	R2D2=R1D1
		R2D2:R2D1	1.1250	0.9889	1.2679	R2D2<R2D1*
		R2D2:R2D3	1.2894	1.0013	1.2834	R2D2<R2D3**
		R2D2:R3D1	1.4645	1.0106	1.2927	R2D2<R3D1**
		R2D2:R4D2	1.3854	1.0199	1.3020	R2D2<R4D2**
		R2D2:R4D3	1.5495	1.0261	1.3113	R2D2<R4D3**
		R3D3:R1D3	0.1134	0.8587	1.1284	R3D3=R1D3
		R3D3:R3D2	0.5526	0.9052	1.1780	R3D3=R3D2
		R3D3:R1D2	0.7504	0.9362	1.2090	R3D3=R1D2
		R3D3:R1D1	0.8276	0.9579	1.2338	R3D3=R1D1
		R3D3:R2D1	1.1455	0.9765	1.2524	R3D3<R2D1*
		R3D3:R2D3	0.9771	0.9889	1.2679	R3D3=R2D3
		R3D3:R3D1	0.8164	1.0013	1.2834	R3D3=R3D1
		R3D3:R4D2	1.2397	1.0106	1.2927	R3D3<R4D2*
		R3D3:R4D3	1.1420	1.0199	1.3020	R3D3<R4D3*
		R1D3:R1D2	0.4594	0.8587	1.1284	R1D3=R3D2
		R1D3:R1D2	0.4515	0.9052	1.1780	R1D3=R1D2
		R1D3:R1D1	0.4115	0.9362	1.2090	R1D3=R1D1
		R1D3:R2D1	0.7482	0.9579	1.2338	R1D3=R2D1
		R1D3:R2D3	0.7694	0.9765	1.2524	R1D3=R2D3
		R1D3:R3D1	1.0230	0.9889	1.2679	R1D3<R3D1*
		R1D3:R4D2	0.9508	1.0013	1.2834	R1D3=R4D2
RD (continued)	A1	R1D3:R4D3	0.7679	1.0106	1.2927	R1D3=R4D3
		R3D2:R1D2	0.0998	0.8587	1.1284	R3D2=R1D2
		R3D2:R1D1	0.1895	0.9052	1.1780	R3D2=R1D1
		R3D2:R2D1	0.3887	0.9362	1.2090	R3D2=R2D1
		R3D2:R2D3	0.4200	0.9579	1.2338	R3D2=R2D3
		R3D2:R3D1	0.3513	0.9765	1.2524	R3D2=R3D1
		R3D2:R4D2	0.4836	0.9889	1.2679	R3D2=R4D2
		R3D2:R4D3	0.5899	1.0013	1.2834	R3D2=R4D3
		R1D2:R1D1	0.0322	0.8587	1.1284	R1D2=R1D1
		R1D2:R2D1	0.1747	0.9052	1.1780	R1D2=R2D1
		R1D2:R2D3	0.2552	0.9362	1.2090	R1D2=R2D3
		R1D2:R3D1	0.3609	0.9579	1.2338	R1D2=R3D1
		R1D2:R4D2	0.2720	0.9765	1.2524	R1D2=R4D2
		R1D2:R4D3	0.3850	0.9889	1.2679	R1D2=R4D3
		R1D1:R2D1	0.1107	0.8587	1.1284	R1D1=R2D1
		R1D1:R2D3	0.1573	0.9052	1.1780	R1D1=R2D3
		R1D1:R3D1	0.1791	0.9362	1.2090	R1D1=R3D1
		R1D1:R4D2	0.3195	0.9579	1.2338	R1D1=R4D2
		R1D1:R4D3	0.3627	0.9765	1.2524	R1D1=R4D3
		R2D1:R2D3	0.0529	0.8587	1.1284	R2D1=R2D3
		R2D1:R3D1	0.1365	0.9052	1.1780	R2D1=R3D1
		R2D1:R4D2	0.2254	0.9362	1.2090	R2D1=R4D2
		R2D1:R4D3	0.2883	0.9579	1.2338	R2D1=R4D3
		R2D3:R3D1	0.1240	0.8587	1.1284	R2D3=R3D1

Source Table 18--(continued)

Variable	Level of Practice	Comparison	Weighted Difference	$z_{.05}S$	$z_{.01}S$	Results
RD (continued)	A1	R2D3;R4D2	0.1523	0.9052	1.1780	R2D3=R4D2
		R2D3:R4D3	0.1703	0.9362	1.2090	R2D3=R4D3
		R3D1:R4D2	0.0167	0.8587	1.1284	R3D1=R4D2
		R3D1:R4D3	0.0546	0.9052	1.1780	R3D1=R4D3
		R4D2:R4D3	0.0399	0.8587	1.1284	R4D2=R4D3
RD	A2	F non-significant; all means equivalent.				
RD	A3	F non-significant; all means equivalent.				
RD	A4	F non-significant; all means equivalent.				
RC	A1	R2C2:R3C1	0.2245	0.8587	1.1284	R2C2=R3C1
		R2C2:R4C1	0.4281	0.9052	1.1780	R2C2=R4C1
		R2C2:R1C2	0.4802	0.9362	1.2090	R2C2=R1C2
		R2C2:R1C1	1.0203	0.9579	1.2338	R2C2<R1C1*
		R2C2:R4C2	1.0415	0.9765	1.2524	R2C2<R4C2*
		R2C2:R3C2	1.1012	0.9889	1.2679	R2C2<R3C2*
		R2C2:R2C1	1.1721	1.0013	1.2834	R2C2<R2C1*
		R3C1:R4C1	0.1325	0.8587	1.1284	R3C1=R4C1
		R3C1:R1C2	0.4281	0.9052	1.1780	R3C1=R1C2
		R3C1:R1C1	0.5608	0.9362	1.2090	R3C1=R1C1
		R3C1:R4C2	1.0044	0.9579	1.2338	R3C1<R4C2*
		R3C1:R3C2	0.7056	0.9765	1.2524	R3C1=R3C2
		R3C1:R2C1	1.1012	0.9889	1.2679	R3C1<R2C1*
		R4C1:R1C2	0.2245	0.8587	1.1284	R4C1=R1C2
		R4C1:R1C1	0.4774	0.9052	1.1780	R4C1=R1C1
		R4C1:R4C2	0.5519	0.9362	1.2090	R4C1=R4C2
		R4C1:R3C2	1.0203	0.9579	1.2338	R4C1<R3C2*
		R4C1:R2C1	1.0415	0.9765	1.2524	R4C1<R2C1*
		R1C2:R1C1	0.2654	0.8587	1.1284	R1C2=R1C1
		R1C2:R4C2	0.4774	0.9052	1.1780	R1C2=R4C2
		R1C2:R3C2	0.5608	0.9362	1.2090	R1C2=R3C2
		R1C2:R2C1	1.0203	0.9579	1.2338	R1C2<R2C1*
		R1C1:R4C2	0.2245	0.8587	1.1284	R1C1=R4C2
		R1C1:R3C2	0.4281	0.9052	1.1780	R1C1=R3C2
		R1C1:R2C1	0.4802	0.9362	1.2090	R1C1=R2C1
		R4C2:R3C2	0.1337	0.8587	1.1284	R4C2=R3C2
		R4C2:R2C1	0.4281	0.9052	1.1780	R4C2=R2C1
		R3C2:R2C1	0.2245	0.8587	1.1284	R3C2=R2C1
RC	A2	F non-significant; all means equivalent.				

Source Table 18--(continued)

Variable	Level of Practice	Comparison	Weighted Difference	$z_{.05}S$	$z_{.01}S$	Results
RC	A3	F non-significant; all means equivalent .				
RC	A4	F non-significant; all means equivalent .				
DC	A1	D2C2:D1C1	0.2827	0.8587	1.1284	D2C2=D1C1
		D2C2:D3C1	0.9604	0.9052	1.1780	D2C2<D3C1*
		D2C2:D3C2	0.8908	0.9362	1.2090	D2C2=D3C2
		D2C2:D1C2	1.2602	0.9579	1.2338	D2C2<D1C2**
		D2C2:D2C1	1.2480	0.9765	1.2524	D2C2<D2C1*
		D1C1:D3C1	0.3964	0.8587	1.1284	D1C1=D3C1
		D1C1:D3C2	1.2529	0.9052	1.1780	D1C1<D3C2**
		D1C1:D1C2	0.9604	0.9362	1.2090	D1C1<D1C2*
		D1C1:D2C1	1.2602	0.9579	1.2338	D1C1<D2C1**
		D3C1:D3C2	0.2822	0.8587	1.1284	D3C1=D3C2
		D3C1:D1C2	1.2529	0.9052	1.1780	D3C1<D1C2**
		D3C1:D2C1	0.8908	0.9362	1.2090	D3C1=D2C1
		D3C2:D1C2	0.3964	0.8587	1.1284	D3C2=D1C2
		D3C2:D2C1	0.9604	0.9052	1.1780	D3C2<D2C1*
		D1C2:D2C1	0.2827	0.8587	1.1284	D1C2=D2C1
DC	A2	F non-significant; all means equivalent .				
DC	A3	F non-significant; all means equivalent .				
DC	A4	F non-significant; all means equivalent .				

Source Table 18-- (continued)

Vari-able	Level of Practice	Com-parison	Weighted Difference	$Z_{.05}$ S	$Z_{.01}$ S	Results
S	A1	F non-significant; all means equivalent.				
S	A2	S2:S1	1.3233	1.0803	1.4196	S2<S1*
S	A3	S2:S1	1.3469	0.9972	1.3104	S2<S1**
S	A4	S2:S1	3.6158	1.7174	2.2568	S2<S1**

* $P < .05$
** $P < .01$

Source Table 19

Means (Rounded): Comparisons Within the B5 Group

Variable	Variant	Level of practice (A)			
		A1	A2	A3	A4
M	M1	1.1242	1.4065	1.3980	1.8653
	M2	1.0808	1.3213	1.3622	1.9419
R	R1	1.0192	1.2309	1.2346	1.5883
	R2	1.0446	1.3241	1.4183	1.8635
	R3	1.1411	1.4438	1.3319	2.0061
	R4	1.2051	1.4568	1.5356	2.1565
D	D1	0.7972	1.2002	1.3671	2.1876
	D2	1.2711	1.4768	1.5116	1.8054
	D3	1.2392	1.4147	1.2616	1.7178
C	C1	1.1040	1.3658	1.3978	1.9193
	C2	1.1010	1.3620	1.3624	1.8879
MR	M1R1	1.0192	1.3007	1.2374	1.5121
	M1R2	1.0827	1.3438	1.3381	1.7874
	M1R3	1.0630	1.4769	1.3859	1.8969
	M1R4	1.3362	1.5046	1.6422	2.2648
	M2R1	1.0235	1.1611	1.2318	1.6645
	M2R2	1.0065	1.3044	1.4985	1.9396
	M2R3	1.2192	1.4107	1.4707	2.1153
	M2R4	1.0740	1.4090	1.3312	2.3414
MD	M1D1	0.9188	1.2557	1.3922	2.2000
	M1D2	1.3053	1.5560	1.5601	1.7452
	M1D3	1.1485	1.4078	1.2417	1.6507
	M2D1	0.6756	1.1447	1.3420	2.1752
	M2D2	1.2369	1.3976	1.4631	1.8656
	M2D3	1.3299	1.4216	1.2815	1.7049

Source Table 19-- (continued)

Variable	Variant	Level of practice (A)			
		A1	A2	A3	A4
MC	M1C1	1.1349	1.3615	1.3865	1.7981
	M1C2	1.1135	1.4515	1.4223	1.9325
	M2C1	1.0731	1.3701	1.4219	2.0405
	M2C2	1.0885	1.2725	1.3025	1.8433
RD	R1D1	0.8937	1.0357	1.1866	2.0250
	R1D2	1.0488	1.3187	1.3603	1.3541
	R1D3	1.1101	1.3383	1.1569	1.3858
	R2D1	0.7806	1.2008	1.4630	2.1094
	R2D2	1.2102	1.4252	1.5295	1.8225
	R2D3	1.1430	1.3463	1.2624	1.6586
	R3D1	0.7945	1.3061	1.3833	2.4337
	R3D2	1.3399	1.6221	1.5174	1.8630
	R3D3	1.2889	1.4032	1.0950	1.7216
	R4D1	0.7200	1.2582	1.4355	2.1823
	R4D2	1.4805	1.5412	1.6392	2.1820
	R4D3	1.4148	1.5710	1.5321	2.1052
RC	R1C1	1.0228	1.2275	1.5153	1.6152
	R1C2	1.0156	1.2343	1.5359	1.5614
	R2C1	1.1051	1.3292	1.4386	1.8609
	R2C2	0.9841	1.3190	1.3980	1.8661
	R3C1	1.1921	1.4373	1.3582	2.0683
	R3C2	1.4371	1.4503	1.3056	1.9439
	R4C1	1.0960	1.4692	1.5495	2.1328
	R4C2	1.3142	1.4444	1.5217	2.1802
DC	D1C1	0.7495	1.5601	1.3464	2.1550
	D1C2	0.8449	1.2327	1.3878	2.2202
	D2C1	1.2982	1.4916	1.5350	1.8339
	D2C2	1.2440	1.4878	1.4882	1.7769
	D3C1	1.2643	1.4381	1.3120	1.7690
	D3C2	1.2141	1.3913	1.2112	1.6666
S	S1	1.0241	1.3032	1.3541	1.8609
	S2	1.1809	1.4246	1.4061	1.9463

Source Table 20

Results of Analyses of Covariance Among Means: Comparisons Within the B5 Group

Source	df	Mean Square A1	Mean Square A2	Mean Square A3	Mean Square A4
Total	383	0.1577	0.1966	0.1854	0.5862
Regression	27	0.7966	0.5877	0.5873	2.6987
Error	356	0.1093	0.1670	0.1549	0.4260
M	1	0.0485	0.6980*	0.1232	0.5642
R	3	0.2052	1.1022***	1.5790***	5.6471***
D	2	4.4862***	2.6939***	2.0211***	7.9965***
C	1	0.0005	0.0014	0.1205	0.9480
MR	3	0.2873*	0.0445	0.5870**	0.9368
MD	2	0.4980*	0.2520	0.1535	0.2423
MC	1	0.0141	0.8460*	0.6785*	2.6432*
RD	6	0.1495	0.1415	0.2665	0.9479
RC	3	0.3098*	0.0466	0.0048	0.1286
DC	2	0.3703*	0.1162	0.1649	0.2403
S	1	0.4153	0.3380	0.0620	0.1673
MA	--	--	--	--	--
CA	1	1.9146***	3.9303***	2.6912***	27.3835***
IQ	1	0.0041	0.1731	0.0742	0.8041

* $P < .05$
** $P < .01$
*** $P < .001$

Source Table 21

Results of Kramer's Multiple Range Test of Differences Between Pairs of Means: Compairsons Within the B5 Group

Vari-able	Level of Practice	Com-parison	Weighted Difference	$Z_{.05}$ S	$Z_{.01}$ S	Results
M	A1	F non-significant; all means equivalent.				
M	A2	M2:M1	1.1806	1.1357	1.4924	M2<M1*
M	A3	F non-significant; all means equivalent.				
M	A4	F non-significant; all means equivalent.				
R	A1	F non-significant; all means equivalent.				
R	A2	R1:R2	0.9132	1.1357	1.4924	R1=R2
		R1:R3	2.0860	1.1972	1.5580	R1<R3**
		R1:R4	2.2134	1.2382	1.5990	R1<R4**
		R2:R3	1.1728	1.1357	1.4924	R2<R3*
		R2:R4	1.3002	1.1972	1.5580	R2<R4*
		R3:R4	0.1274	1.1357	1.4924	R3=R4
R	A3	R1:R3	0.9533	1.0803	1.4196	R1=R3
		R1:R2	1.7999	1.1388	1.4820	R1<R2**
		R1:R4	2.9492	1.7788	1.5210	R1<R4**
		R3:R2	0.8465	1.0803	1.4196	R3=R2
		R3:R4	1.9959	1.1388	1.4820	R3<R4**
		R2:R4	1.1493	1.0803	1.4196	R2<R4*

Source Table 21--(continued)

Variable	Level of Practice	Comparison	Weighted Difference	$s_{.05}S$	$s_{.01}S$	Results
R	A4	R1:R2	2.6964	1.8005	2.3660	R1<R2**
		R1:R3	4.0936	1.8980	2.4700	R1<R3**
		R1:R4	5.5672	1.9630	2.5350	R1<R4**
		R2:R3	1.3972	1.8005	2.3660	R2=R3
		R2:R4	2.8708	1.8980	2.4700	R2<R4**
		R3:R4	1.4736	1.8005	2.3660	R3=R4
D	A1	D1:D3	6.8331	0.9141	1.2012	D1<D3**
		D1:D2	3.9079	0.9636	1.2540	D1<D2**
		D3:D2	0.4420	0.9141	1.2012	D3=D2
D	A2	D1:D3	2.4268	1.1357	1.4924	D1<D3**
		D1:D2	3.1294	1.1972	1.5580	D1<D2**
		D3:D2	0.7026	1.1357	1.4924	D3=D2
D	A3	D3:D1	1.1936	1.0803	1.4196	D3<D1*
		D3:D2	2.8284	1.1388	1.4820	D3<D2**
		D1:D2	1.6348	1.0803	1.4196	D1<D2**
D	A4	D3:D2	0.9108	1.8005	2.3660	D3=D2
		D3:D1	5.3152	1.8980	2.4700	D3<D1**
		D2:D1	4.3241	1.8005	2.3660	D2<D1**
MR	A1	M2R4:M1R3	0.0750	0.9141	1.2012	M2R4=M1R3
		M2R4:M1R1	0.6928	0.9636	1.2540	M2R4=M1R1
		M2R4:M2R2	0.5808	0.9966	1.2870	M2R4=M2R2
		M2R4:M1R2	1.0374	1.0197	1.3134	M2R4<M1R2*
		M2R4:M2R1	0.6494	1.0395	1.3332	M2R4=M2R1
		M2R4:M2R3	1.2725	1.0527	1.3497	M2R4<M2R3*
		M2R4:M1R4	0.9785	1.0659	1.3662	M2R4=M1R4
		M1R3:M1R1	0.3905	0.9141	1.2012	M1R3=M1R3
		M1R3:M2R2	0.6928	0.9636	1.2540	M1R3=M2R2
		M1R3:M1R2	0.8379	0.9966	1.2870	M1R3=M1R2
		M1R3:M2R1	1.0374	1.0197	1.3134	M1R3<M2R1*
		M1R3:M2R3	1.0372	1.0395	1.3332	M1R3=M2R3
		M1R3:M1R4	1.2725	1.0527	1.3497	M1R3<M1R4*
		M1R1:M2R2	0.0705	0.9141	1.2012	M1R1=M2R2
		M1R1:M1R2	0.2399	0.9636	1.2540	M1R1=M1R2
		M1R1:M2R1	0.2014	0.9966	1.2870	M1R1=M2R1
		M1R1:M2R3	1.0374	1.0197	1.3134	M1R1<M2R3*
		M1R1:M1R4	0.6494	1.0395	1.3332	M1R1=M1R4
		M2R2:M1R2	0.1884	0.9141	1.2012	M2R2=M1R2

Source Table 21--(continued)

Variable	Level of Practice	Comparison	Weighted Difference	$\underline{s}_{.05}S$	$\underline{s}_{.01}S$	Results
MR	A1 (Continued)	M2R2:M2R1	0.2399	0.9636	1.2540	M2R2=M2R1
		M2R2:M2R3	0.8379	0.9966	1.2870	M2R2=M2R3
		M2R2:M1R4	1.0374	1.0197	1.3134	M2R2<M1R4*
		M1R2:M2R1	0.0750	0.9141	1.2012	M1R2=M2R1
		M1R2:M2R3	0.6928	0.9636	1.2540	M1R2=M2R3
		M1R2:M1R4	0.5808	0.9966	1.2870	M1R2=M1R4
		M2R1:M2R3	0.3905	0.9141	1.2012	M2R1=M2R3
		M2R1:M1R4	0.6928	0.9636	1.2540	M2R1=M1R4
		M2R3:M1R4	0.0750	0.9141	1.2012	M2R3=M1R4
MR	A2	F non-significant; all means equivalent.				
MR	A3	M1R2:M2R4	0.1303	1.0803	1.4196	M1R2=M2R4
		M1R2:M2R3	1.0198	1.1388	1.4820	M1R2=M2R3
		M1R2:M1R1	0.8132	1.1778	1.5210	M1R2=M1R1
		M1R2:M2R1	1.5685	1.2051	1.5522	M1R2<M2R1**
		M1R2:M1R3	1.2012	1.2285	1.5756	M1R2=M1R3
		M1R2:M1R4	1.8303	1.2441	1.5951	M1R2<M1R4**
		M1R2:M2R2	1.5696	1.2597	1.6146	M1R2<M2R2*
		M2R4:M2R3	0.6290	1.0830	1.4196	M2R4=M2R3
		M2R4:M1R1	1.0198	1.1388	1.4820	M2R4=M1R1
		M2R4:M2R1	1.0170	1.1778	1.5210	M2R4=M2R1
		M2R4:M1R3	1.5685	1.2051	1.5522	M2R4<M1R3**
		M2R4:M1R4	1.4192	1.2285	1.5756	M2R4<M1R4*
		M2R4:M2R2	1.8303	1.2441	1.5951	M2R4<M2R2**
		M2R3:M1R1	0.1303	1.0803	1.4196	M2R3=M1R1
		M2R3:M2R1	0.3880	1.1388	1.4820	M2R3=M2R1
		M2R3:M1R3	0.3920	1.1778	1.5210	M2R3=M1R3
		M2R3:M1R4	1.5685	1.2051	1.5522	M2R3<M1R4**
		M2R3:M2R2	1.2012	1.2285	1.5756	M2R3=M2R2
		M1R1:M2R1	0.2416	1.0803	1.4196	M1R1=M2R1
		M1R1:M1R3	0.3880	1.1388	1.4820	M1R1=M1R3
		M1R1:M1R4	1.0170	1.1778	1.5210	M1R1=M1R4
		M1R1:M2R2	1.5685	1.2051	1.5522	M1R1<M2R2**
		M2R1:M1R3	0.1303	1.0803	1.4196	M2R1=M1R3
		M2R1:M1R4	1.0198	1.1388	1.4820	M2R1=M1R4
		M2R1:M2R2	0.8132	1.1778	1.5210	M2R1=M2R2
		M1R3:M1R4	0.6290	1.0803	1.4196	M1R3=M1R4
		M1R3:M2R2	1.0198	1.1388	1.4820	M1R3=M2R2
		M1R4:M2R2	0.1303	1.0803	1.4196	M1R4=M2R2
MR	A4	F non-significant; all means equivalent.				

Source Table 21--(continued)

Variable	Level of Practice	Comparison	Weighted Difference	$\mathcal{R}_{.05}S$	$\mathcal{R}_{.01}S$	Results
MD	A1	M1D3:M2D1	0.1581	0.9141	1.2012	M1D3=M2D1
		M1D3:M2D2	0.9737	0.9636	1.2540	M1D3<M2D2*
		M1D3:M1D2	1.0300	0.9966	1.2870	M1D3<M1D2*
		M1D3:M1D1	1.2738	1.0197	1.3134	M1D3<M1D1*
		M1D3:M2D3	1.4039	1.0395	1.3332	M1D3<M2D3**
		M2D1:M2D2	0.5316	0.9141	1.2012	M2D1=M2D2
		M2D1:M1D2	1.4084	0.9636	1.2540	M2D1<M1D2**
		M2D1:M1D1	0.9788	0.9966	1.2870	M2D1=M1D1
		M2D1:M2D3	1.2738	1.0197	1.3134	M2D1<M2D3*
		M2D2:M1D2	0.1581	0.9141	1.2012	M2D2=M1D2
		M2D2:M1D1	1.4084	0.9636	1.2540	M2D2<M1D1**
		M2D2:M2D3	1.0300	0.9966	1.2870	M2D2<M2D3*
		M1D2:M1D1	0.5316	0.9141	1.2012	M1D2=M1D1
		M1D2:M2D3	0.9737	0.9636	1.2540	M1D2<M2D3*
		M1D1:M2D3	0.1581	0.9141	1.2012	M1D1=M2D3
MD	A2	F non-significant; all means equivalent.				
MD	A3	F non-significant; all means equivalent.				
MD	A4	F non-significant; all means equivalent.				
MC	A1	F non-significant; all means equivalent.				
MC	A2	M1C1:M2C2	0.0000	1.1357	1.4924	M1C1=M2C2
		M1C1:M1C2	1.2929	1.1972	1.5580	M1C1<M1C2*
		M1C1:M2C1	1.2929	1.2382	1.5990	M1C1<M2C1*
		M2C2:M1C2	1.2929	1.1357	1.4924	M2C2<M1C2*
		M2C2:M2C1	1.2929	1.1972	1.5580	M2C2<M2C1*
		M1C2:M2C1	0.0000	1.1357	1.4924	M1C2=M2C1
MC	A3	M1C1:M2C2	0.0000	1.0803	1.4196	M1C1=M2C2
		M1C1:M1C2	1.1579	1.1388	1.4820	M1C1<M1C2*
		M1C1:M2C1	1.1579	1.1778	1.5210	M1C1=M2C1
		M2C2:M1C2	1.1579	1.0803	1.4196	M2C2<M1C2*
		M2C2:M2C1	1.1579	1.1388	1.4820	M2C2<M2C1*
		M1C2:M2C1	0.0000	1.0803	1.4196	M1C2=M2C1
MC	A4	M1C1:M2C2	0.0000	1.8005	2.3660	M1C1=M2C2
		M1C1:M1C2	2.2854	1.8980	2.4700	M1C1<M1C2*

Source Table 21--(continued)

Variable	Level of Practice	Comparison	Weighted Difference	$B_{.05}S$	$B_{.01}S$	Results
MC (continued)	A4	M1C1:M2C1	2.2854	1.9630	2.5350	M1C1<M2C1*
		M2C2:M1C2	2.2854	1.8005	2.3660	M2C2<M1C2*
		M2C2:M2C1	2.2854	1.8980	2.4700	M2C2<M2C1*
		M1C2:M2C1	0.0000	1.8005	2.3660	M1C2=M2C1
RC	A1	R4C1:R2C2	0.5362	0.9141	1.2012	R4C1=R2C2
		R4C1:R3C2	0.5533	0.9636	1.2540	R4C1=R3C2
		R4C1:R1C2	1.1935	0.9966	1.2870	R4C1<R1C2*
		R4C1:R1C1	0.6762	1.0197	1.3134	R4C1=R1C1
		R4C1:R3C1	1.1433	1.0395	1.3332	R4C1<R3C1*
		R4C1:R2C1	1.2230	1.0527	1.3497	R4C1<R2C1*
		R4C1:R4C2	1.1494	1.0659	1.3662	R4C1<R4C2*
		R2C2:R3C2	0.0783	0.9141	1.2012	R2C2=R3C2
		R2C2:R1C2	0.4552	0.9636	1.2540	R2C2=R1C2
		R2C2:R1C1	0.5533	0.9966	1.2870	R2C2=R1C1
		R2C2:R3C1	1.1935	1.0197	1.3134	R2C2<R3C1*
		R2C2:R2C1	0.8344	1.0395	1.3332	R2C2=R2C1
		R2C2:R4C2	1.7625	1.0527	1.3497	R2C2<R4C2**
		R3C2:R1C2	0.3215	0.9141	1.2012	R3C2=R1C2
		R3C2:R1C1	0.5362	0.9636	1.2540	R3C2=R1C1
		R3C2:R3C1	0.6103	0.9966	1.2870	R3C2=R3C1
		R3C2:R2C1	1.1935	1.0197	1.3134	R3C2<R2C1*
		R3C2:R4C2	1.1433	1.0395	1.3332	R3C2<R4C2*
		R1C2:R1C1	0.0222	0.9141	1.2012	R1C2=R1C1
		R1C2:R3C1	0.5362	0.9636	1.2540	R1C2=R3C1
		R1C2:R2C1	0.5533	0.9966	1.2870	R1C2=R2C1
		R1C2:R4C2	1.2397	1.0197	1.3134	R1C2<R4C2*
		R1C1:R3C1	0.3215	0.9141	1.2012	R1C1=R3C1
		R1C1:R2C1	0.4552	0.9636	1.2540	R1C1=R2C1
		R1C2:R4C2	1.1935	0.9966	1.2870	R1C1<R4C2*
		R3C1:R2C1	0.0783	0.9141	1.2012	R3C1=R2C1
		R3C1:R4C2	0.5533	0.9636	1.2540	R3C1=R4C2
		R2C1:R4C2	0.5362	0.9141	1.2012	R2C1=R4C2
RC	A2	F non-significant; all means equivalent.				
RC	A3	F non-significant; all means equivalent.				
RC	A4	F non-significant; all means equivalent.				
DC	A1	D1C1:D2C2	0.3791	0.9141	1.2012	D1C1=D2C2
		D1C1:D3C2	0.4128	0.9636	1.2540	D1C1=D3C2
		D1C1:D3C1	0.6672	0.9966	1.2870	D1C1=D3C1

Source Table 21--(continued)

Vari-able	Level of Practice	Compari-son	Weighted Differance	$R_{.05}S$	$R_{.01}S$	Results
DC	A1 (continued)	D1C1:D2C1	0.6856	1.0197	1.3134	D1C1=D2C1
		D1C1:D1C2	0.7748	1.0395	1.3332	D1C1=D1C2
		D2C2:D3C2	0.0188	0.9141	1.2012	D2C2=D3C2
		D2C2:D3C1	0.2460	0.9636	1.2540	D2C2=D3C1
		D2C2:D2C1	0.4128	0.9966	1.2870	D2C2=D2C1
		D2C2:D1C2	0.6856	1.0197	1.3134	D2C2=D1C2
		D3C2:D3C1	0.3805	0.9141	1.2012	D3C2=D3C1
		D3C2:D2C1	0.2460	0.9636	1.2540	D3C2=D2C1
		D3C2:D1C2	0.6672	0.9966	1.2870	D3C2=D1C2
		D3C1:D2C1	0.0188	0.9141	1.2012	D3C1=D2C1
		D3C1:D1C2	0.4128	0.9636	1.2540	D3C1=D1C2
		D2C1:D1C2	0.3791	0.9141	1.2012	D2C1=D1C2
DC	A2	F non-significant; all means equivalent .				
DC	A3	F non-significant; all means equivalent .				
DC	A4	F non-significant; all means equivalent .				

* $P < .05$
** $P < .01$

Source Table 22

Means (Rounded): Comparisons Within the B6 Group

Variable	Variant	Level of practice (A)			
		A1	A2	A3	A4
M	M1	1.3198	1.4803	1.4142	2.2730
	M2	1.3406	1.4703	1.4560	2.3266
R	R1	1.0663	1.3368	1.3169	1.9103
	R2	1.2984	1.4327	1.3994	2.2583
	R3	1.3374	1.5492	1.4283	2.4133
	R4	1.6187	1.5825	1.5958	2.6173
D	D1	0.9892	1.3530	1.4884	2.5691
	D2	1.4988	1.5721	1.4802	2.2386
	D3	1.5026	1.5008	1.3367	2.0917
C	C1	1.3000	1.4368	1.4138	2.2744
	C2	1.3604	1.5138	1.4564	2.3252
MR	M1R1	0.8866	1.3145	1.2888	1.8481
	M1R2	1.3064	1.4907	1.2997	2.2258
	M1R3	1.4646	1.4524	1.4164	2.3189
	M1R4	1.6419	1.6636	1.6519	2.6992
	M2R1	1.2660	1.3591	1.3250	1.9725
	M2R2	1.2904	1.3747	1.4991	2.2908
	M2R3	1.2102	1.6460	1.4402	2.5077
	M2R4	1.5955	1.5014	1.5397	2.5354
MD	M1D1	1.0966	1.3407	1.3771	2.4378
	M1D2	1.3696	1.5806	1.5332	2.3192
	M1D3	1.4932	1.5196	1.3323	2.0620
	M2D1	0.8818	1.3653	1.5997	2.7004
	M2D2	1.6280	1.5636	1.4430	2.1580
	M2D3	1.5120	1.4820	1.3411	2.1214

Source Table 22 --(continued)

Variable	Variant	Level of practice (A)			
		A1	A2	A3	A4
MC	M1C1	1.3287	1.4652	1.3573	2.2648
	M1C2	0.3109	1.4954	1.4711	2.2812
	M2C1	1.2713	1.4084	1.4703	2.2840
	M2C2	1.4099	1.5322	1.4417	2.3692
RD	R1D1	0.8793	1.1890	1.3975	2.3478
	R1D2	1.0526	1.5070	1.3335	1.8003
	R1D3	1.2670	1.3144	1.2197	1.5828
	R2D1	0.7749	1.2761	1.5198	2.5230
	R2D2	1.5831	1.5076	1.5087	2.1726
	R2D3	1.5372	1.5144	1.1697	2.0793
	R3D1	0.9678	1.4223	1.5418	2.7276
	R3D2	1.5601	1.6496	1.4436	2.4200
	R3D3	1.4843	1.5757	1.2995	2.0923
	R4D1	1.3348	1.5246	1.4945	2.6780
	R4D2	1.7994	1.6242	1.6350	2.5612
	R4D3	1.7219	1.5987	1.6579	2.6124
RC	R1C1	1.1135	1.3016	1.2534	1.8912
	R1C2	1.0191	1.5786	1.3804	1.9294
	R2C1	1.2360	1.4140	1.4455	2.3105
	R2C2	1.3608	1.4514	1.3533	2.2061
	R3C1	1.2819	1.5254	1.3579	2.3577
	R3C2	1.3929	1.5730	1.4987	2.4689
	R4C1	1.5686	1.5062	1.5984	2.5382
	R4C2	1.6688	1.6588	1.5932	2.6964
DC	D1C1	0.8723	1.6288	1.5026	2.5848
	D1C2	1.1061	1.3842	1.4742	2.5534
	D2C1	1.5987	1.5492	1.4360	2.2579
	D2C2	1.4593	1.5950	1.5244	2.2193
	D3C1	1.4894	1.4394	1.3028	1.9805
	D3C2	1.5158	1.5622	1.3706	2.2029
S	S1	1.3659	1.4756	1.5018	2.3154
	S2	1.2945	1.4750	1.3684	2.2842

Source Table 23

Results of Least Squares Analyses of Differences Among Means: Comparisons Within the B6 Group

Source	df	Mean Square A1	Mean Square A2	Mean Square A3	Mean Square A4
Total	383	0.1415	0.1812	0.1565	0.5290
Regression	27	0.8280	0.5032	0.5656	2.3994
Error	356	0.0895	0.1568	0.1254	0.3871
M	1	0.0076	0.0093	0.1618	0.2660
R	3	0.9653***	1.2442***	1.3382***	8.8238***
D	2	4.5392***	1.5323***	0.9183***	7.3263***
C	1	6.1983	0.5490	0.1680	0.2389
MR	3	0.3754**	0.6172**	0.3632*	0.5682
MD	2	0.4405**	0.0299	0.8331**	1.3622*
MC	1	0.1737	0.2028	0.4694	0.1096
RD	6	0.2887**	0.1049	0.4222**	0.8084*
RC	3	0.0858	0.0630	0.2683	0.2808
DC	2	0.4175**	0.0519	0.1180	0.7005
S	1	0.0782	0.0001	0.3770	0.0206
MA	1	--	--	--	--
CA	1	1.0361***	2.8238***	1.1040**	9.4529***
IQ	1	0.3463	0.1208	0.6129*	0.5912

* P< .05
** P< .01
*** P< .001

Source Table 24

Results of Kramer's Multiple Range Test of Differences Between Pairs of Means: Comparisons Within the B6 Group

Variable	Level of Practice	Comparison	Weighted Difference	$Z_{.05}$ S	$Z_{.01}$ S	Results
R	A1	R1:R2	1.0886	0.8310	1.0920	R1<R2*
		R1:R3	1.1178	0.8760	1.1400	R1<R3*
		R1:R4	2.2096	0.9060	1.1700	R1<R4**
		R2:R3	0.2730	0.8310	1.0920	R2=R3
		R2:R4	1.8949	0.8760	1.1400	R2<R4**
		R3:R4	1.7340	0.8310	1.0920	R3<R4**
R	A2	R1:R2	0.9098	1.1080	1.4560	R1=R2
		R1:R3	2.1134	1.1680	1.5200	R1<R3**
		R1:R4	2.4447	1.2080	1.5600	R1<R4**
		R2:R3	1.0929	1.1080	1.4560	R2=R3
		R2:R4	1.4052	1.1680	1.5200	R2<R4*
		R3:R4	0.3263	1.1080	1.4560	R3=R4
R	A3	R1:R2	0.7827	0.9695	1.2740	R1=R2
		R1:R3	1.1084	1.0225	1.3300	R1<R3*
		R1:R4	2.7750	1.0570	1.3650	R1<R4**
		R2:R3	0.2711	0.9695	1.2740	R2=R3
		R2:R4	1.8424	1.0225	1.3300	R2<R4**
		R3:R4	1.6412	0.9695	1.2740	R3<R4**
R	A4	R1:R2	3.3014	1.7174	2.2564	R1<R2**
		R1:R3	5.0048	1.8104	2.3560	R1<R3**
		R1:R4	7.0346	1.8724	2.4180	R1<R4**
		R2:R3	1.4540	1.7174	2.2564	R2=R3
		R2:R4	3.3677	1.8104	2.3560	R2<R4**
		R3:R4	1.9988	1.7174	2.2564	R3<R4*

Source Table 24 -- (continued)

Vari-able	Level of Practice	Compari-son	Weighted Difference	$\bar{z}_{.05}{}^{S}$	$\bar{z}_{.01}{}^{S}$	Results
D	A1	D1:D2	3.8474	0.8310	1.0920	D1<D2**
		D1:D3	3.9435	0.8760	1.1400	D1<D3**
		D2:D3	0.0354	0.8310	1.0920	D2=D3
D	A2	D1:D3	1.6392	1.1080	1.4560	D1<D3**
		D1:D2	2.4398	1.1680	1.5200	D1<D2**
		D3:D2	0.8067	1.1080	1.4560	D3=D2
D	A3	D3:D2	1.6235	0.9695	1.2740	D3<D2**
		D3:D1	1.6824	1.0225	1.3300	D3<D1**
		D2:D1	0.0913	0.9695	1.2740	D2=D1
D	A4	D3:D2	1.6620	1.7174	2.2564	D3=D2
		D3:D1	5.2946	1.8104	2.3560	D3<D1**
		D2:D1	3.6803	1.7174	2.2564	D2<D1**
MR	A1	M1R1:M2R3	0.3764	0.8310	1.0920	M1R1=M2R3
		M1R1:M2R4	1.1959	0.8760	1.1400	M1R1<M2R4**
		M1R1:M2R2	1.1464	0.9060	1.1700	M1R1<M2R2*
		M1R1:M1R2	0.9742	0.9270	1.1940	M1R1<M1R2*
		M1R1:M1R4	0.8916	0.9450	1.2120	M1R1=M1R4
		M1R1:M1R3	1.4249	0.9570	1.2270	M1R1<M1R3**
		M1R1:M2R1	1.1972	0.9690	1.2420	M1R1<M2R1*
		M2R3:M2R4	0.6411	0.8310	1.0920	M2R3=M2R4
		M2R3:M2R2	0.8678	0.8760	1.1400	M2R3=M2R2
		M2R3:M1R2	1.1983	0.9060	1.1700	M2R3<M1R2**
		M2R3:M1R4	1.1484	0.9270	1.1940	M2R3<M1R4*
		M2R3:M1R3	1.4032	0.9450	1.2120	M2R3<M1R3**
		M2R3:M2R1	1.4249	0.9570	1.2270	M2R3<M2R1**
		M2R4:M2R2	0.0925	0.8310	1.0920	M2R4=M2R2
		M2R4:M1R2	0.3786	0.8760	1.1400	M2R4=M1R2
		M2R4:M1R4	0.2771	0.9060	1.1700	M2R4=M1R4
		M2R4:M1R3	1.1484	0.9270	1.1940	M2R4<M1R3*
		M2R4:M2R1	0.8916	0.9450	1.2120	M2R4=M2R1
		M2R2:M1R2	0.2016	0.8310	1.0920	M2R2=M1R2
		M2R2:M1R4	0.3786	0.8760	1.1400	M2R2=M1R4
		M2R2:M1R3	1.1983	0.9060	1.1700	M2R2<M1R3**
		M2R2:M2R1	0.9742	0.9270	1.1940	M2R2<M2R1*
		M1R2:M1R4	0.0925	0.8310	1.0920	M1R2=M1R4
		M1R2:M1R3	0.8678	0.8760	1.1400	M1R2=M1R3
		M1R2:M2R1	1.1464	0.9060	1.1700	M1R2<M2R1*

Source Table 24 -- (continued)

Variable	Level of Practice	Comparison	Weighted Difference	$Z_{.05}S$	$Z_{.01}S$	Results
MR (continued)	A1	M1R4:M1R3	0.6411	0.8310	1.0920	M1R4=M1R3
		M1R4:M2R1	1.1959	0.8760	1.1400	M1R4<M2R1**
		M1R3:M2R1	0.3764	0.8310	1.0920	M1R3=M2R1
MR	A2	M1R3:M2R4	0.3524	1.1080	1.4560	M1R3=M2R4
		M1R3:M2R2	0.6638	1.1680	1.5200	M1R3=M2R2
		M1R3:M1R1	0.7413	1.2080	1.5600	M1R3=M1R1
		M1R3:M2R1	1.7560	1.2360	1.5920	M1R3<M2R1**
		M1R3:M1R2	1.4521	1.2600	1.6160	M1R3<M1R2*
		M1R3:M1R4	1.7431	1.2760	1.6360	M1R3<M1R4**
		M1R3:M2R3	1.6288	1.2920	1.6560	M1R3<M2R3*
		M2R4:M2R2	0.2167	1.1080	1.4560	M2R4=M2R2
		M2R4:M1R1	0.6638	1.1680	1.5200	M2R4=M1R1
		M2R4:M2R1	1.0288	1.2080	1.5600	M2R4=M2R1
		M2R4:M1R2	1.7560	1.2360	1.5920	M2R4=M1R2
		M2R4:M1R4	1.2081	1.2600	1.6160	M2R4=M1R4
		M2R4:M2R3	1.7431	1.2760	1.6360	M2R4<M2R3**
		M2R2:M1R1	0.3524	1.1080	1.4560	M2R2=M1R1
		M2R2:M2R1	0.7618	1.1680	1.5200	M2R2=M2R1
		M2R2:M1R2	0.8003	1.2080	1.5600	M2R2=M1R2
		M2R2:M1R4	1.7560	1.2360	1.5920	M2R2<M1R4**
		M2R2:M2R3	1.4521	1.2600	1.6160	M2R2<M2R3*
		M1R1:M2R1	0.4402	1.1080	1.4560	M1R1=M2R1
		M1R1:M1R2	0.7618	1.1680	1.5200	M1R1=M1R2
		M1R1:M1R4	1.0288	1.2080	1.5600	M1R1=M1R4
		M1R1:M2R3	1.7560	1.2360	1.5920	M1R1<M2R3**
		M2R1:M1R2	0.3524	1.1080	1.4560	M2R1=M1R2
		M2R1:M1R4	0.6638	1.1680	1.5200	M2R1=M1R4
		M2R1:M2R3	0.7413	1.2080	1.5600	M2R1=M2R3
		M1R2:M1R4	0.2167	1.1080	1.4560	M1R2=M1R4
		M1R2:M2R3	0.6638	1.1680	1.5200	M1R2=M2R3
		M1R4:M2R3	0.3524	1.1080	1.4560	M1R4=M2R3
MR	A3	M1R2:M2R4	0.0245	0.9695	1.2740	M1R2=M2R4
		M1R2:M2R3	0.9494	1.0225	1.3300	M1R2=M2R3
		M1R2:M1R1	0.6793	1.0570	1.3650	M1R2=M1R1
		M1R2:M2R1	1.1792	1.0815	1.3930	M1R2<M2R1*
		M1R2:M1R3	0.8236	1.1025	1.4140	M1R2=M1R3
		M1R2:M1R4	1.4615	1.1165	1.4315	M1R2<M1R4**
		M1R2:M2R2	1.1898	1.1305	1.4490	M1R2<M2R2*
		M2R4:M2R3	0.6663	0.9695	1.2740	M2R4=M2R3
		M2R4:M1R1	0.9494	1.0225	1.3300	M2R4=M1R1
		M2R4:M2R1	0.8378	1.0570	1.3650	M2R4=M2R1

Source Table 24 -- (continued)

Vari-able	Level of Practice	Compari-son	Weighted Difference	$Z_{.05}S$	$Z_{.01}S$	Results
MR	A3 (continued)	M2R4:M1R3	1.1792	1.0815	1.3930	M2R4<M1R3*
		M2R4:M1R4	1.2223	1.1025	1.4140	M2R4<M1R4*
		M2R4:M2R2	1.4615	1.1165	1.4315	M2R4<M2R2**
		M2R3:M1R1	0.0245	0.9695	1.2740	M2R3=M1R1
		M2R3:M2R1	0.1612	1.0225	1.3300	M2R3=M2R1
		M2R3:M1R3	0.1440	1.0570	1.3650	M2R3=M1R3
		M2R3:M1R4	1.1792	1.0815	1.3930	M2R3<M1R4*
		M2R3:M2R2	0.8236	1.1025	1.4140	M2R3=M2R2
		M1R1:M2R1	0.1161	0.9695	1.2740	M1R1=M2R1
		M1R1:M1R3	0.1612	1.0225	1.3300	M1R1=M1R3
		M1R1:M1R4	0.8378	1.0570	1.3650	M1R1=M1R4
		M1R1:M2R2	1.1792	1.0815	1.3930	M1R1<M2R2*
		M2R1:M1R3	0.0245	0.9695	1.2740	M2R1=M1R3
		M2R1:M1R4	0.9494	1.0225	1.3300	M2R1=M1R4
		M2R1:M2R2	0.6793	1.0570	1.3650	M2R1=M2R2
		M1R3:M1R4	0.6663	0.9695	1.2740	M1R3=M1R4
		M1R3:M2R2	0.9494	1.0225	1.3300	M1R3=M2R2
		M1R4:M2R2	0.0245	0.9695	1.2740	M1R4=M2R2
MR	A4	F non-significant; all means equivalent.				
MD	A1	M1D2:M2D1	0.0113	0.8310	1.0920	M1D2=M2D1
		M1D2:M2D3	0.8971	0.8760	1.1400	M1D2<M2D3*
		M1D2:M1D3	0.9951	0.9060	1.1700	M1D2<M1D3*
		M1D2:M1D1	1.1347	0.9270	1.1940	M1D2<M1D1*
		M1D2:M2D2	1.3229	0.9450	1.2120	M1D2<M2D2**
		M2D1:M2D3	0.5722	0.8310	1.0920	M2D1=M3D3
		M2D1:M1D3	1.3229	0.8760	1.1400	M2D1<M1D3**
		M2D1:M1D1	0.8815	0.9060	1.1700	M2D1=M1D1
		M2D1:M2D2	1.1347	0.9270	1.1940	M2D1<M2D2*
		M2D3:M1D3	0.0113	0.8310	1.0920	M2D3=M1D3
		M2D3:M1D1	1.3229	0.8760	1.1400	M2D3=M1D1**
		M2D3:M2D2	0.9951	0.9060	1.1700	M2D3<M2D2*
		M1D3:M1D1	0.5722	0.8310	1.0920	M1D3=M1D1
		M1D3:M2D2	0.8971	0.8760	1.1400	M1D3<M2D2*
		M1D1:M2D2	0.0113	0.8310	1.0920	M1D1=M2D2
MD	A2	F non-significant; all means equivalent.				
MD	A3	M1D1:M2D2	0.3191	0.9695	1.2740	M1D1=M2D2
		M1D1:M2D3	1.4330	1.0225	1.3300	M1D1<M2D3**
		M1D1:M1D3	1.1710	1.0570	1.3650	M1D1<M1D3*

Source Table 24 -- (continued)

Variable	Level of Practice	Comparison	Weighted Difference	$Z_{.05}S$	$Z_{.01}S$	Results
MD	A3 (continued)	M1D1:M1D2	1.8073	1.0815	1.3930	M1D1<M1D2**
		M1D1:M2D1	1.7057	1.1025	1.4140	M1D1<M2D1**
		M2D2:M2D3	0.6469	0.9695	1.2740	M2D2=M2D3
		M2D2:M1D3	1.7057	1.0225	1.3300	M2D2<M1D3**
		M2D2:M1D2	1.4330	1.0570	1.3650	M2D2<M1D2**
		M2D2:M2D1	1.8073	1.0815	1.3930	M2D2<M2D1**
		M2D3:M1D3	0.3199	0.9695	1.2740	M2D2=M1D3
		M2D3:M1D2	1.7057	1.0225	1.3300	M2D3<M1D2**
		M2D3:M2D1	1.1710	1.0570	1.3650	M2D2<M2D1*
		M1D3:M1D2	0.6469	0.9695	1.2740	M1D3=M1D2
		M1D3:M2D1	1.4330	1.0225	1.3300	M1D3<M2D1**
		M1D2:M2D1	0.3191	0.9695	1.2740	M1D2=M2D1
MD	A4	M2D2:M1D1	0.0561	1.7174	2.2564	M2D2=M1D1
		M2D2:M1D3	1.9717	1.8104	2.3560	M2D2<M1D3*
		M2D2:M2D3	1.2430	1.8724	2.4180	M2D2=M2D3
		M2D2:M2D1	2.3309	1.9158	2.4676	M2D2<M2D1*
		M2D2:M1D2	2.0826	1.9530	2.5048	M2D2=M1D2
		M1D1:M1D3	1.1130	1.7174	2.2564	M1D1=M1D3
		M1D1:M2D3	2.0826	1.8104	2.3560	M1D1<M2D3*
		M1D1:M2D1	1.9717	1.8724	2.4180	M1D1<M2D1*
		M1D1:M1D2	2.3309	1.9158	2.4676	M1D1<M1D2*
		M1D3:M2D3	0.0562	1.7174	2.2564	M1D3=M2D3
		M1D3:M2D1	2.0826	1.8104	2.3560	M1D3<M2D1*
		M1D3:M1D2	1.2430	1.8724	2.4180	M1D3=M1D2
		M2D3:M2D1	1.1130	1.7174	2.2564	M2D3=M2D1
		M2D3:M1D2	1.9717	1.8104	2.3560	M2D3<M1D2*
		M2D1:M1D2	0.0561	1.7174	2.2564	M2D1=M1D2
RD	A1	R2D1:R1D2	0.0011	0.8310	1.0920	R2D1=R1D2
		R2D1:R4D3	0.7430	0.8760	1.1400	R2D1=R4D3
		R2D1:R3D1	0.6883	0.9060	1.1700	R2D1=R3D1
		R2D1:R3D3	1.0295	0.9270	1.1940	R2D1<R3D3*
		R2D1:R4D2	1.2460	0.9450	1.2120	R2D1<R4D2**
		R2D1:R1D3	1.0749	0.9570	1.2270	R2D1<R1D3*
		R2D1:R3D2	1.5515	0.9690	1.2420	R2D1<R3D2**
		R2D1:R4D1	1.0444	0.9780	1.2510	R2D1<R4D1*
		R2D1:R2D3	1.2445	0.9870	1.2600	R2D1<R2D3*
		R2D1:R2D2	1.4930	0.9930	1.2690	R2D1<R2D2**
		R2D1:R1D1	1.3033	1.0020	1.2780	R2D1<R1D1**
		R1D2:R4D3	0.5541	0.8310	1.0920	R1D2=R4D3
		R1D2:R3D1	0.9093	0.8760	1.1400	R1D2<R3D1*
		R1D2:R3D3	0.7995	0.9060	1.1700	R1D2=R3D3
		R1D2:R4D2	0.7776	0.9270	1.1940	R1D2=R4D2

Source Table 24 -- (continued)

Vari-able	Level of Practice	Compari-son	Weighted Difference	$z_{.05}S$	$z_{.01}S$	Results
RD	A1 (continued)	R1D2:R1D3	0.8935	0.9450	1.2120	R1D2=R1D3
		R1D2:R3D2	0.9456	0.9570	1.2270	R1D2=R3D2
		R1D2:R4D1	1.3959	0.9690	1.2420	R1D2<R4D1**
		R1D2:R2D3	1.4069	0.9780	1.2510	R1D2<R2D3**
		R1D2:R2D2	1.4311	0.9870	1.2600	R1D2<R2D2**
		R1D2:R1D1	1.0089	0.9930	1.2690	R1D2<R1D1*
		R4D3:R3D1	0.2148	0.8310	1.0920	R4D3=R3D1
		R4D3:R3D3	0.2433	0.8760	1.1400	R4D3=R3D3
		R4D3:R4D2	0.4145	0.9060	1.1700	R4D3=R4D2
		R4D3:R1D3	0.3776	0.9270	1.1940	R4D3=R1D3
		R4D3:R3D2	0.7798	0.9450	1.2120	R4D3=R3D2
		R4D3:R4D1	0.4892	0.9570	1.2270	R4D3=R4D1
		R4D3:R2D3	0.7302	0.9690	1.2420	R4D3=R2D3
		R4D3:R2D2	1.1118	0.9780	1.2510	R4D3<R2D2*
		R4D3:R1D1	1.1381	0.9870	1.2600	R4D3<R1D1*
		R3D1:R3D3	0.0128	0.8310	1.0920	R3D1=R3D3
		R3D1:R4D2	0.2035	0.8760	1.1400	R3D1=R4D2
		R3D1:R1D3	0.3414	0.9060	1.1700	R3D1=R1D3
		R3D1:R3D2	0.3308	0.9270	1.1940	R3D1=R3D2
		R3D1:R4D1	0.4198	0.9450	1.2120	R3D1=R4D1
		R3D1:R2D3	0.5620	0.9570	1.2270	R3D1=R2D3
		R3D1:R2D2	0.8561	0.9690	1.2420	R3D1=R2D2
		R3D1:R1D1	0.5478	0.9780	1.2510	R3D1=R1D1
		R3D3:R4D2	0.2408	0.8310	1.0920	R3D3=R4D2
		R3D3:R1D3	0.2218	0.8760	1.1400	R3D3=R1D3
		R3D3:R3D2	0.4287	0.9060	1.1700	R3D3=R3D2
		R3D3:R4D1	0.4130	0.9270	1.1940	R3D3=R4D1
		R3D3:R2D3	0.5199	0.9450	1.2120	R3D3=R2D3
		R3D3:R2D2	0.9177	0.9570	1.2270	R3D3=R2D2
		R3D3:R1D1	0.8975	0.9690	1.2420	R3D3=R1D1
		R4D2:R1D3	0.0826	0.8310	1.0920	R4D2=R1D3
		R4D2:R3D2	0.2376	0.8760	1.1400	R4D2=R3D2
		R4D2:R4D1	0.1800	0.9060	1.1700	R4D2=R4D1
		R4D2:R2D3	0.3519	0.9270	1.1940	R4D2=R2D3
		R4D2:R2D2	0.5883	0.9450	1.2120	R4D2=R2D2
		R4D2:R1D1	0.7095	0.9570	1.2270	R4D2=R1D1
		R1D3:R3D2	0.1264	0.8310	1.0920	R1D3=R2D2
		R1D3:R4D1	0.1728	0.8760	1.1400	R1D3=R4D1
		R1D3:R2D3	0.1827	0.9060	1.1700	R1D3=R2D3
		R1D3:R2D2	0.5120	0.9270	1.1940	R1D3=R2D2
		R1D3:R1D1	0.3771	0.9450	1.2120	R1D3=R1D1
		R3D2:R4D1	0.0144	0.8310	1.0920	R3D2=R4D1
		R3D2:R2D3	0.0778	0.8760	1.1400	R3D2=R2D3
		R3D2:R2D2	0.3452	0.9060	1.1700	R3D2=R2D2
		R3D2:R1D1	0.5191	0.9270	1.1940	R3D2=R1D1
		R4D1:R2D3	0.0542	0.8310	1.0920	R4D1=R2D3

Source Table 24 -- (continued)

Variable	Level of Practice	Comparison	Weighted Difference	$Z_{.05}S$	$Z_{.01}S$	Results
RD	A1 (continued)	R4D1:R2D2	0.3490	0.8760	1.1400	R4D1=R2D2
		R4D1:R1D1	0.2907	0.9060	1.1700	R4D1=R1D1
		R2D3:R2D2	0.2982	0.9270	1.1940	R2D3=R2D2
		R2D3:R1D1	0.3818	0.8760	1.1400	R2D3=R1D1
		R2D2:R1D1	0.1652	0.8310	1.0920	R2D2=R1D1
RD	A2	F non-significant; all means equivalent.				
RD	A3	R4D1:R2D3	0.2045	0.9695	1.2740	R4D1=R2D3
		R4D1:R3D3	1.0684	1.0225	1.3300	R4D1<R3D3*
		R4D1:R3D2	1.0516	1.0570	1.3650	R4D1=R3D2
		R4D1:R1D2	1.0774	1.0815	1.3930	R4D1=R1D2
		R4D1:R4D2	0.9637	1.1025	1.4140	R4D1=R4D2
		R4D1:R1D3	1.3220	1.1165	1.4315	R4D1<R1D3*
		R4D1:R1D1	1.2862	1.1305	1.4490	R4D1<R1D1*
		R4D1:R3D1	1.4882	1.1410	1.4595	R4D1<R3D1**
		R4D1:R2D2	1.9200	1.1515	1.4700	R4D1<R2D2**
		R4D1:R2D1	1.3666	1.1585	1.4875	R4D1<R2D1*
		R4D1:R4D3	2.0176	1.1690	1.4910	R4D1<R4D3**
		R2D3:R3D3	0.6843	0.9695	1.2740	R2D3=R3D3
		R2D3:R3D2	0.8370	1.0225	1.3300	R2D3=R3D2
		R2D3:R1D2	0.8723	1.0570	1.3650	R2D3=R1D2
		R2D3:R4D2	1.0492	1.0815	1.3930	R2D3=R4D2
		R2D3:R1D3	0.8888	1.1025	1.4140	R2D3=R1D3
		R2D3:R1D1	1.4007	1.1165	1.4315	R2D3<R1D1*
		R2D3:R3D1	1.6804	1.1305	1.4490	R2D3<R3D1**
		R2D3:R2D2	1.2820	1.1410	1.4595	R2D3<R2D2*
		R2D3:R2D1	1.1569	1.1515	1.4700	R2D3<R2D1*
		R2D3:R4D3	1.9575	1.1585	1.4875	R2D3<R4D3**
		R3D3:R3D2	0.0039	0.9695	1.2740	R3D3=R3D2
		R3D3:R1D2	0.0168	1.0225	1.3300	R3D3=R1D2
		R3D3:R4D2	0.2150	1.0570	1.3650	R3D3=R4D2
		R3D3:R1D3	0.2212	1.0815	1.3930	R3D3=R1D3
		R3D3:R1D1	0.4997	1.1025	1.4140	R3D3=R1D1
		R3D3:R3D1	0.5872	1.1165	1.4315	R3D3=R3D1
		R3D3:R2D2	0.7971	1.1305	1.4490	R3D3=R2D2
		R3D3:R2D1	0.7921	1.1410	1.4595	R3D3=R2D1
		R3D3:R4D3	1.3088	1.1515	1.4700	R3D3<R4D3*
		R3D2:R1D2	0.0090	0.9695	1.2740	R3D2=R1D2
		R3D2:R4D2	0.1656	1.0225	1.3300	R3D2=R4D2
		R3D2:R1D3	0.2720	1.0570	1.3650	R3D2=R1D3
		R3D2:R1D1	0.4945	1.0815	1.3930	R3D2=R1D1
		R3D2:R3D1	0.5763	1.1025	1.4140	R3D2=R3D1
		R3D2:R2D2	0.6306	1.1165	1.4315	R3D2=R2D2

Source Table 24 -- (continued)

Variable	Level of Practice	Comparison	Weighted Difference	$Z_{.05}^{S}$	$Z_{.01}^{S}$	Results
RD	A3 (continued)	R3D2:R2D1	0.8049	1.1305	1.4490	R3D2=R2D1
		R3D2:R4D3	1.6699	1.1410	1.4595	R3D2<R4D3**
		R1D2:R4D2	0.1566	0.9695	1.2740	R1D2=R4D2
		R1D2:R1D3	0.1925	1.0225	1.3300	R1D2=R1D3
		R1D2:R1D1	0.3701	1.0570	1.3650	R1D2=R1D1
		R1D2:R3D1	0.7630	1.0815	1.3930	R1D2=R3D1
		R1D2:R2D2	0.6287	1.1025	1.4140	R1D2=R2D2
		R1D2:R2D1	0.7708	1.1165	1.4315	R1D2=R2D1
		R1D2:R4D3	1.6477	1.1305	1.4490	R1D2<R4D3**
		R4D2:R1D3	0.0627	0.9695	1.2740	R4D2=R1D3
		R4D2:R1D1	0.2875	1.0225	1.3300	R4D2=R1D1
		R4D2:R3D1	0.5686	1.0570	1.3650	R4D2=R3D1
		R4D2:R2D2	0.4754	1.0815	1.3930	R4D2=R2D2
		R4D2:R2D1	0.5975	1.1025	1.4140	R4D2=R2D1
		R4D2:R4D3	1.0784	1.1165	1.4315	R4D2=R4D3
		R1D3:R1D1	0.1731	0.9695	1.2740	R1D3=R1D1
		R1D3:R3D1	0.5041	1.0225	1.3300	R1D3=R3D1
		R1D3:R2D2	0.5308	1.0570	1.3650	R1D3=R2D2
		R1D3:R2D1	0.5394	1.0815	1.3930	R1D3=R2D1
		R1D3:R4D3	1.1037	1.1025	1.4140	R1D3<R4D3*
		R1D1:R3D1	0.2326	0.9695	1.2740	R1D1=R3D1
		R1D1:R2D2	0.3259	1.0225	1.3300	R1D1=R2D2
		R1D1:R2D1	0.2548	1.0570	1.3650	R1D1=R2D1
		R1D1:R4D3	1.1536	1.0815	1.3930	R1D1<R4D3*
		R3D1:R2D2	0.0351	0.9695	1.2740	R3D1-R2D2
		R3D1:R2D1	0.0431	1.0225	1.3300	R3D1=R2D1
		R3D1:R4D3	0.8511	1.0570	1.3650	R3D1=R4D3
		R2D2:R2D1	0.0169	0.9695	1.2740	R2D2=R2D1
		R2D2:R4D3	0.7999	1.0225	1.3300	R2D2=R4D3
		R2D1:R4D3	0.7702	0.9695	1.2740	R2D1=R4D3
RD	A4	R4D1:R1D3	0.7569	1.7174	2.2564	R4D1=R1D3
		R4D1:R3D3	0.8232	1.8104	2.3560	R4D1=R3D3
		R4D1:R1D2	1.3653	1.8724	2.4180	R4D1=R1D2
		R4D1:R2D2	1.6155	1.9158	2.4676	R4D1=R2D2
		R4D1:R2D1	1.2575	1.9530	2.5048	R4D1=R2D1
		R4D1:R4D2	1.3869	1.9778	2.5358	R4D1=R4D2
		R4D1:R2D3	2.0858	2.0026	2.5668	R4D1<R2D3*
		R4D1:R3D1	1.7570	2.0212	2.5854	R4D1=R3D1
		R4D1:R3D2	2.3298	2.0398	2.6040	R4D1<R3D2*
		R4D1:R1D1	2.6644	2.0522	2.6226	R4D1<R1D1**
		R4D1:R4D3	2.6368	2.0708	2.6412	R4D1<R4D3*
		R1D3:R3D3	0.0455	1.7174	2.2564	R1D3=R3D3
		R1D3:R1D2	0.4575	1.8104	2.3560	R1D3=R1D2
		R1D3:R2D2	0.7996	1.8724	2.4180	R1D3=R2D2

Source Table 24 -- (continued)

Variable	Level of Practice	Comparison	Weighted Difference	$z_{.05}^{S}$	$z_{.01}^{S}$	Results
RD	A4 (continued)	R1D3:R2D1	0.9397	1.9158	2.4676	R1D3=R2D1
		R1D3:R4D2	1.1022	1.9530	2.5048	R1D3=R4D2
		R1D3:R2D3	0.9962	1.9778	2.5358	R1D3=R2D3
		R1D3:R3D1	1.4046	2.0026	2.5668	R1D3=R3D1
		R1D3:R3D2	1.6436	2.0212	2.5854	R1D3=R3D2
		R1D3:R1D1	1.9077	2.0398	2.6040	R1D3=R1D1
		R1D3:R4D3	2.2350	2.0522	2.6226	R1D3<R4D3*
		R3D3:R1D2	0.5661	1.7174	2.2564	R3D3=R1D2
		R3D3:R2D2	0.7449	1.8104	2.3560	R3D3=R2D2
		R3D3:R2D1	0.8798	1.8724	2.4180	R3D3=R2D1
		R3D3:R4D2	1.0381	1.9158	2.4676	R3D3=R4D2
		R3D3:R2D3	0.9631	1.9530	2.5048	R3D3=R2D3
		R3D3:R3D1	1.0233	1.9778	2.5358	R3D3=R3D1
		R3D3:R3D2	1.1717	2.0026	2.5568	R3D3=R3D2
		R3D3:R1D1	2.4344	2.0212	2.5854	R3D3<R1D1*
		R3D3:R4D3	2.1671	2.0398	2.6040	R3D3<R4D3*
		R1D2:R2D2	0.1648	1.7174	2.2564	R1D2=R2D2
		R1D2:R2D1	0.3564	1.8104	2.3560	R1D2=R2D1
		R1D2:R4D2	0.3755	1.8724	2.4180	R1D2=R4D2
		R1D2:R2D3	0.6610	1.9158	2.4676	R1D2=R2D3
		R1D2:R3D1	0.8069	1.9530	2.5048	R1D2=R3D1
		R1D2:R3D2	0.8085	1.9778	2.5358	R1D2=R3D2
		R1D2:R1D1	1.4394	2.0026	2.5668	R1D2=R1D1
		R1D2:R4D3	2.1969	2.0212	2.5854	R1D2<R4D3*
		R2D2:R2D1	0.1160	1.7174	2.2564	R2D2=R2D1
		R2D2:R4D2	0.2028	1.8104	2.3560	R2D2=R4D2
		R2D2:R2D3	0.3515	1.8724	2.4180	R2D2=R2D3
		R2D2:R3D1	0.6099	1.9158	2.4676	R2D2=R3D1
		R2D2:R3D2	0.6198	1.9530	2.5048	R2D2=R3D2
		R2D2:R1D1	1.7019	1.9778	2.5358	R2D2=R1D1
		R2D2:R4D3	1.8914	2.0026	2.5668	R2D2=R4D3
		R2D1:R4D2	0.0819	1.7174	2.2564	R2D1=R4D2
		R2D1:R2D3	0.1965	1.8104	2.3560	R2D1=R2D3
		R2D1:R3D1	0.3098	1.8724	2.4180	R2D1=R3D1
		R2D1:R3D2	0.6022	1.9158	2.4676	R2D1=R3D2
		R2D1:R1D1	1.1065	1.9530	2.5048	R2D1=R1D1
		R2D1:R4D3	1.7136	1.9778	2.5358	R2D1=R4D3
		R4D2:R2D3	0.1983	1.7174	2.2564	R4D2=R2D3
		R4D2:R3D1	0.3407	1.8104	2.3560	R4D2=R3D1
		R4D2:R3D2	0.4330	1.8724	2.4180	R4D2=R3D2
		R4D2:R1D1	1.4099	1.9158	2.4676	R4D2=R1D1
		R4D2:R4D3	1.2819	1.9530	2.5043	R4D2=R4D3
		R2D3:R3D1	0.1395	1.7174	2.2564	R2D3=R3D1
		R2D3:R3D2	0.3200	1.8104	2.3560	R2D3=R3D2
		R2D3:R1D1	1.2285	1.8724	2.4180	R2D3=R1D1
		R2D3:R4D3	1.1679	1.9158	2.4676	R2D3=R4D3

Source Table 24 -- (continued)

Variable	Level of Practice	Comparison	Weighted Difference	$z_{.05}^{S}$	$z_{.01}^{S}$	Results
RD (continued)	A4	R3D1:R3D2	0.1466	1.7174	2.2564	R3D1=R3D2
		R3D1:R1D1	0.8712	1.8104	2.3560	R3D1=R1D1
		R3D1:R4D3	1.3424	1.8724	2.4180	R3D1=R4D3
		R3D2:R1D1	0.8686	1.7174	2.2564	R3D2=R1D1
		R3D2:R4D3	1.1873	1.8104	2.3560	R3D2=R4D3
		R1D1:R4D3	0.3031	1.7174	2.2564	R1D1=R4D3
DC	A1	D1C1:D2C2	0.2589	0.8310	1.0920	D1C1=D2C2
		D1C1:D3C2	1.0753	0.8760	1.1400	D1C1=D3C2
		D1C1:D3C1	0.8425	0.9060	1.1700	D1C1=D3C1
		D1C1:D2C1	1.2897	0.9270	1.1940	D1C1<D2C1**
		D1C1:D1C2	1.1888	0.9450	1.1212	D1C1<D1C2**
		D2C2:D3C2	0.4859	0.8310	1.0920	D2C2=D3C2
		D2C2:D3C1	1.1888	0.8760	1.1400	D2C2<D3C1**
		D2C2:D2C1	1.0707	0.9060	1.1700	D2C2<D2C1*
		D2C2:D1C2	1.2897	0.9270	1.1940	D2C2<D1C2**
		D3C2:D3C1	0.2589	0.8310	1.0920	D3C2=D3C1
		D3C2:D2C1	1.1888	0.8760	1.1400	D3C2<D2C1**
		D3C2:D1C2	0.8425	0.9060	1.1700	D3C2=D1C2
		D3C1:D2C1	0.4859	0.8310	1.0920	D3C1=D2C1
		D3C1:D1C2	1.0753	0.8760	1.1400	D3C1<D1C2*
		D2C1:D1C2	0.2589	0.8310	1.0920	D2C1=D1C2
DC	A2	F non-significant; all means equivalent.				
DC	A3	F non-significant; all means equivalent.				
DC	A4	F non-significant; all means equivalent.				

* $P < .05$

** $P < .01$